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FARMER'S DIGEST STAFF
Editor — L. Bush-Brown
Publisher — Hugh Highsmith
Office Manager — V. M. Binkert

ADVISORY EDITORIAL STAFF
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Hugh H. Bennett, Ex-Officio, Soil Conservation Society of America
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H. J. Reed, Dean of the School of Agriculture; Purdue University
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## Coming in May

### DON'T MISS THESE ARTICLES

Below are a few of the carefully selected articles to appear in the next issue of Farmer's Digest. If your subscription is expiring or if you are not now a regular subscriber, take a minute now to renew or enter your subscription.

**What's New In Farm Machines?**
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The Farmers Digest

Volume 18 April, 1955 Number 10

# Coming . . .

# A NEW WEATHER PROPHET

**Big electronic "brain" promises near-perfect forecasting. It may be ready in time to help your haying . . .**

Condensed from The Wall Street Journal

*Lester Tanzer*

The latest bulletin from Government weathermen: Near-perfect weather forecasting is just around the corner.

Don't snicker. For U. S. scientists think they have the answer to the age-old enigma of weather-predicting. It's a gifted contraption with the impressive name of IBM 701 Electronic Data Processing Machine. Known familiarly as "Seven-Oh-One," this machine is capable of absorbing huge quantities of atmospheric information, solving complex mathematical equations—and even drawing maps. It's expected to start producing fragmentary forecasts by midsummer.

A year or so hence, say Federal meteorologists, the new "weather-brain" will be working full tilt and furnishing daily nationwide, 24 - hour - to - 48-hour weather predictions that promise to far excel current prognostications. Later, officials hope the new computer will turn to longer-term forecasts, like the 5-day and 30-day weather "outlooks" now published by the U. .S Weather Bureau.

Reprinted by permission from The Wall Street Journal, Chicago 90, Illinois

But even the improved short-range forecasts will be a boon to farmers, airlines, construction firms, and thousands of other businesses, big and small, that need speedy, detailed and accurate weather guides for their day-to-day operations.

### Farmers, Airlines, Builders

Weather Bureau officials figure forecasting now is accurate enough for most purposes, though they note errors are not infrequent. But the new electronic technique will enable the weathermen to take into account many more atmospheric clues, apply them to tremendously elaborate equations, and come up in a matter of minutes with "answers" that would take an army of highly-trained mathematicians days to duplicate. The result: Much greater accuracy, and more detail in the weather forecasting of the future.

Precise predictions are vital to many folks. If the weatherman predicts temperatures between 35 and 40 degrees Fahrenheit and the mercury dips to freezing, the average citizen isn't likely to complain very loudly; but the citrus grower who fails to light his smudge pots may suffer extensive frost damage to his crops.

Home builders have to keep a close eye on the weather. Some roofing compounds can't be shipped if there is danger of freezing en route; outside painting is usually delayed in wet or cold weather; concrete often won't set if temperatures remain below freezing, unless special materials are added.

### A $500,000 Budget

Right now, 30 shirt-sleeved mathematicians and meteorologists are busy preparing for the arrival of "Seven-Oh-One"; they are the members of the Joint Numerical Weather Prediction Unit, set up last July by the U. S. Weather Bureau, the Navy, and the Air Force with a budget of $500,000 for the year. They'll rent the custom-built computer from International Business Machines for about $20,000 a month—the approximate cost of keeping the "brain" humming 10 hours a day, seven days a week.

For the past seven months, JNWPU has been polishing the equations to be fed to Seven-Oh-One; it will go through a long series of test runs before it actually starts prognosticating. At the beginning, the computer will be asked to predict only certain aspects of the weather such as air pressure patterns. Later it will try its hand at divining vertical air movements; early in 1956 the machine is scheduled to begin making complete weather forecasts.

The big "brain" does more

than speed up current predicting; it permits use of a quite different approach to weather forecasting. Under the present scheme, thousands of observers across the nation make on-the-spot reports on weather conditions. This information is plotted on a map. Forecasters then try to draw another chart showing how things will look 24 hours or more ahead. Basically, they rely on past experience to do this predicting, coupled with some relatively simple scientific calculations.

### Keeping Abreast

The new electronic technique relies entirely on basic laws of physics and aerodynamics. Using these laws, the scientists work out elaborate equations, based on all sorts of weather factors. Actually the theories behind these equations have been familiar to meteorologists since long before the turn of the century; the catch has been that the human mind has been unable to work out all the necessary computations fast enough to produce timely forecasts. One scientist reckons it would take 60,000 men working night and day to keep up with the weather by paper-and-pencil arithmetic using the "scientific" approach.

But the development of electronic computers now makes what the scientists call "numerical" predicting practical. Since the war, scientists have been laboring at the job of working out the necessary equations. For example, scientific weathermen have successfully "forecast" sudden freak storms "after the fact" by feeding into electronic computers data based on atmospheric conditions that were reported before the storm occurred.

Here's how one JNWPU worker describes the mental process of Seven-Oh-One: "It all boils down to a numbers game; physical properties and principles of the atmosphere are reduced to equations. You 'instruct' the computer beforehand on how to solve the equations. Then, when you get your weather observations—things like air pressure, wind velocity, temperature—you put them on punch cards and feed them into the right part of the computer so they fit into the equations.

### Eventually: A Map

"The machine starts whirring, knocks off maybe 10 million calculations in short order, and out comes a flood of numbers that correspond to what the air pressure, velocity, temperature and other weather conditions will be 24 hours later or 48 hours later from Maine to California.

Says one observer: "About the only thing this machine won't do is sing 'Stormy Weather'."

As at present, the "brain's" charts will be sent to stations throughout the country by facsimile or by coded transmission over a vast teletypewriter circuit. The "progs," as they're called, are supposed to supplement local weather analyses and, in the case of smaller offices, relieve the forecaster of most weather analysis.

### Grain Pit Watch

Nearly every phase of agriculture, from planting and growing through harvesting and processing, are affected by the weather. So farmers usually plan their daily operations only after they get an idea of what the skies hold in store for them. Daily forecasts of weather in farm areas are also eagerly awaited by some city folk—the people who trade in commodities. Prominently displayed on the trading floor of the Chicago Board of Trade, major grain center, is a big map of the U. S., replete with lines, numbers and symbols that tell what the day's weather is like.

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## Clean Calf Pens With Your Tractor

Tired of cleaning calf pens by hand? There's an easier way says Stan Witzel, farm engineer at the University of Wisconsin.

Cleaning calf pens at the Steel Dairy Barn on the university's East Hill Farm took too much time and labor. So Witzel had the calf-pen partitions cut off at the floor, a double door cut in the side of the barn, and a tractor with a manure loader brought in.

That did the job in a hurry, and it didn't take much work.

Now, except for a permanent partition along the feed alley, all calf pen partitions in the Steel Barn are hung on chains from hooks in the ceiling. The movable partitions are snubbed with a piece of rope to the permanent partition and to the opposite wall, holding them steady.

Witzel says 12 inch concrete curbs around the pens hold the manure as it piles up. The partitions can be raised on the chains as bedding is added.

When the manure gets deep enough, the movable partitions are swung to one side, the manure loader brought in, and the pens cleaned with a minimum of time and effort. Witzel thinks most farmers could fix their calf pens the same way, and save a lot of hard work during the winter.

*Wisconsin Extension*

# Report On Green-Lot Feeding

**What does it cost? What kind of returns? Does it fit my farm? These and many other questions are answered in this report from six states . . .**

Condensed from Successful Farming
*Vernon Schneider*

## IOWA

Tests were set up to answer three big questions on green-lot feeding:

- What is the feeding value of green chopped forages?
- What are the time and machinery costs involved?
- What is the value of feeding concentrates and corn (with and without protein supplement) to cattle being full-fed green chopped forage?

Four lots of 8 steers each were fed brome-alfalfa pasture choppings starting about the middle of May. One lot was fed green chopped forage alone. The other three were fed various combinations of grain and protein supplements. Four additional lots of cattle of similar origin were grazed on brome-alfalfa pasture for comparing performance.

*Green-lot-fed beef produced* 480 *pounds of beef per acre as compared to* 190 *for grazed animals. Green-lot-fed cattle gained* 1.71 *pounds daily compared to* 1.50 *pounds for those getting their feed from grazing. The cost per pound of beef produced from green-lot feeding (based on clipping costs and pasture costs) was* 14.5 *cents per pound. This compared to* 20.9 *cents a pound on steers that harvested their own forage.*

Clipping costs were figured at $6.32 per ton on green chopped forage. Pasture costs (potential yield of hay on the pasture field) were figured at $10.25 per acre.

The addition of a protein supplement resulted in no reduction in feed cost per pound of gain in either green-lot or on pasture.

Results in 1954 were almost identical with past experiments with one exception. The overall rate of gain was down about .25 pound per head per day. However, the same drop in the rate of gain was noted in all lots. *Higher wintering gains probably accounted for this differ-*

Reprinted by permission from Successful Farming, Des Moines, Iowa

*ence.* Treatment was about the same as in the past year.

## MINNESOTA

Green-lot feeding and daily rotational grazing were compared. A total of 70 cows were used in this experiment. Half were fed green chopped forage and the others were rotationally grazed. Cows in both groups were fed as much hay as they would eat and grain (1:6 ratio) according to the amount of milk they produced.

*Total milk yields for both systems of management were remarkably alike. However, only* 30.6 *acres were required to provide nutrients needed for green-lot-fed cows as compared to* 50.9 *acres for cows on pasture. On this basis, the average milk yield per acre was* 2,539 *pounds for green-lot-fed cows and* 1,525 *for cows on pasture.*

Silage-fed cows ate large amounts of grass, often over 200 pounds daily. Cows seemed to like the chopped material very much. They preferred young plants over more mature plants. Crops used for green-lot feeding included oats-alfalfa-brome, oats, orchard - Ladino, alfalfa - brome, and sudan.

Other advantages and disadvantages of green-lot feeding listed by the Minnesota research workers are as follows:

**Advantages:**

- Pasture can be managed like other crops regarding maturing and cutting at the optimum times.
- Bloating is almost eliminated.
- Pastures do not become contaminated from manure and trampling.
- Fences can be eliminated.

**Disadvantages:**

- It leans heavily on mechanization. Breakdowns can be a problem.
- Rainy spells and wet spots are a problem with heavy machinery.
- Labor and equipment costs are greater.

Results indicate that increased production from green-lot feeding is obtained from the *taller* soiling crops, such as sudan. With *shorter* crops, *little* if any increase in production was noted. A single crop, alfalfa-brome, was used in experiments during the past pasturing season. Results showed no advantage for green-lot feeding over pasturing, probably because the crop was never more than about a foot tall.

## CALIFORNIA

Yearling Hereford steers were compared under systems of rotation grazing, strip grazing, green soiling (green-lot feeding), and wilt soiling (forage is wilted before being chopped) in experiments conducted at the Imperial

Valley Field Station. Ten steers were in each group.

The experiment showed *no* significant difference in daily gains over a 168-day feeding period. *However, there were definite differences in the amount of beef produced per acre and in the carrying capacity of the fields.*

- Green soiling (green lot)—704 pounds of beef produced per acre. To carry 10 steers, 4.08 acres were required.
- Strip grazing—580 pounds of beef per acre. To carry 10 steers, 4.47 acres were required.
- Wilt soiling—568 pounds of beef produced per acre. To carry 10 steers, 4.67 acres were required.
- Rotation grazing—417 pounds of beef produced per acre. To carry 10 steers, 6.07 acres were required.

## PURDUE

Continuous grazing, daily rotation grazing, and green-lot feeding systems of feeding dairy cows were tested in 1953. Similar groups of cows were on alfalfa-Ladino and bromegrass.

*The cows produced about the same amount of milk on all three systems.* The daily pasture rotation system resulted in 3,998 pounds of milk, the green-lot feeding system produced 3,867 pounds of milk, and the continuous pasturing system 3,617 pounds of milk. This was figured on the basis of milk produced per cow per acre per season.

*However, in efficiency of land use (production of milk per acre), it was calculated that green-lot feeding was capable of producing* 6,414 *pounds of milk, daily rotation system* 5,497 *pounds, and continuously grazed pasture* 5,093 *pounds.*

In beef experiments during the 1954 season, green-lot-fed cattle gained 1.3 pounds per day as compared to .8 pound for pastured animals. However, the severe drouth was the big factor in lowering gains on pasture. Experiment was discontinued August 1 due to short pasture.

Past beef experiments at Purdue showed *no* significant difference in the growth rate of cattle fed on chopped forages as compared to grazed steers.

## RUTGERS

A "zero" pasture program—New Jersey's name for green-lot feeding—was credited with *a daily saving of* 920 *pounds of feed (green basis) for a dairy herd of* 50 *Holstein cows during a* 3*-month period.*

The 50 cows in the trial consumed an average of 92 pounds of green feed daily per animal. This green feed furnished the cows with almost 19 pounds of dry matter a day.

Labor required for cutting forage twice daily for a herd of

50 cows was 2.76 hours. This time could be reduced if cutting were done only once daily. Labor required for maintaining and servicing the harvesting equipment was about .35 hour per day.

In addition to increased carrying capacity, green-lot feeding enables the dairyman to harvest his pasture at its proper stage of maturity. Perhaps one of the most important advantages to dairymen is the elimination of summer slumps in production.

### MICHIGAN

Preliminary results in 1954 at Michigan State College show that continuous grazing had an advantage over green-lot feeding when green forage was chopped *only* 3 times a week.

Twenty yearling steers gained .62 pound per day on green-lot feeding as compared to 1.4 pounds per day from continuous grazing. Green-lot feeding had a slight edge in beef produced per acre—103 pounds to 98 pounds for continuous grazing. But, 1.1 tons of hay per acre were produced on continuously grazed area. Only 12½ acres were required to carry the 20 yearling steers when green-lot fed as compared to 30 acres for the 20 pastured cattle.

Research workers believe that daily-gain differences would not have been as great had the forage been chopped and hauled to the cattle every day. Mold became a problem after the green forage was in the self-feeding wagons for 2 or 3 days, cutting down consumption.

## Cost of Silos

How much does a silo cost? In Michigan, an unlined trench silo with a 150-ton capacity costs about $70. A bunker silo of the same capacity costs about $800. An upright concrete stave silo, nearly $1,600.

Estimates of total cost for storage, spoilage and feeding of grass silage was the lowest for the bunker silo—$1.63 a ton. The figure was $2.25 for the upright silo and for the unlined trench silo when the silage was fed in bunks—or $2.75 if fed in the barn.

If you're short of money and have the proper site, you can have satisfactory storage with the unlined trench silo. While a bunker silo costs more, you can self-feed livestock.

And the upright silo, while costing still more, does cut spoilage losses; the feeding is done inside and the silo adds to the appearance of the farmstead.

*Michigan Extension*

# PASTURE BOOSTER

## Birdsfoot trefoil is restoring neglected acres to useful grazing . . .

Condensed from Ohio Farmer

*L. E. Sarbaugh*

BIRDSFOOT trefoil is prodding "back forties" off the singletree and into the collar where they will pull their share of the farm load, says Elwood Davis, agricultural extension agent at Mt. Gilead, Ohio. "Around here, once a farmer tries birdsfoot, he keeps on with it," he adds.

"There are thousands of acres of worn-out, neglected pastures right here in Morrow county that are producing little if any forage for farm livestock." Davis relates. "Birdsfoot offers an easy, sure-fire way to raise their carrying capacity and thus add to farm income.

Durability of this forage plant is one of its best features. Several stands of the hardy legume are now seven years old, and still thick and vigorous. It winters well and withstands close grazing better than alfalfa. Also more tolerant of variations in soil moisture and soil acidity, birdsfoot trefoil can be established on high ground or on low ground, good soil or poor soil, according to the county agent.

"I have yet to hear of the failure of a birdsfoot seeding, although I recall one that made a disappointingly slow start, and the owner came close to plowing it under. Luckily, I went with him to the back end of his farm where the seeding lay, and we found it had finally taken hold and was doing well.

"Use of the legume in permanent pastures boomed in recent years. We can name 40 or more fellows that had it on their farms last year," Davis reports.

At the Morrow County Home, a new birdsfoot seeding is competing successfully with volunteer Ladino clover from a seeding made 21 years ago. Daniel Coleman has a seven-year-old birdsfoot stand on an adjoining farm.

Nearby are a creditable stand established last year by Harold McClelland on renovated pasture, and a three-year-old stand of birdsfoot mixed with timothy and brome grass on the E. J.

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Logan and Sons farm.

On the farm of Fred and Buford Brown, a mid-August seeding of birdsfoot alone made a four-inch top growth. Both men admit that favorable rainfall after seeding brought this late seeding to a successful stand.

Sam Burgett, who with his father George Burgett, farms 160 acres in neighboring Richland County, likes birdsfoot first rate. They now have 12 to 15 acres of the legume, with their oldest stand two years old. Seeding with oats has worked best.

Oats is also the best starter for Forrest Noble. He knows now that birdsfoot does better when it is the only legume. Last year when a four-acre patch stayed wet too late to seed oats, he plowed it for corn, but filled only one seed box on the corn planter. Between the resulting 80-inch corn rows he seeded a mixture half birdsfoot and half alfalfa-red clover-Ladino blend. The alfalfa, red clover and Ladino got off to a faster start and crowded the birdsfoot seriously.

Jerseys prefer birdsfoot to alfalfa pasture in a side-by-side seeding on George Jackson's 117 acres. He turned under a dense nitrogen-treated bluegrass sod to reseed half of a 10-acre barnside pasture to an alfalfa-brome grass mixture, and half to birdsfoot-brome.

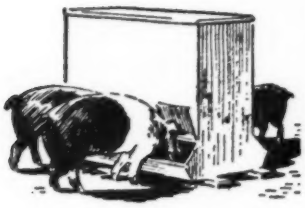
His Jerseys graze the birdsfoot down close before they show interest in the alfalfa, Jackson says. Sometimes they even circle the field, passing right through the alfalfa to return to the birdsfoot. Only when they have grazed the birdsfoot off do they turn to the alfalfa.

While he recognizes that alfalfa is slightly superior to birdsfoot in total forage produced, Jackson thinks there are compensating virtues. "I have noticed," he says, "that when the cows are on birdsfoot pasture they come to the barn without the evidence of bloating they usually show from alfalfa. That probably means there is more real feed in their paunches.

"It means a lot to a fellow's peace of mind when he knows there's no danger of bloat. That factor alone puts birdsfoot trefoil high in my estimation. I expect to use it in all my pastures when I reseed them."

---

**In 1955 and probably several later years,** farmers as a group will face the problem of adjusting to the cost-price squeeze in agriculture. Economists of the U.S. Department of Agriculture say farmers with substantial financial reserves can make needed adjustments easily. But such adjustments may bring hardships to young farmers or farmers already in debt. The specialists point out that such farmers may need to explore all possible ways of cutting costs, not only production costs, but family living costs as well. *Farm Ranch & Home News*



# He Buys Corn for 1500 Shotes

## Here is a hog enterprise which pays good profits year in and year out . . .

Condensed from Breeder's Gazette

*A. E. Holden*

IN 1953, Maynard Swihart raised 1,500 hogs on his 200 acres in LaGrange County, Indiana, and sold them for $85,000. Can you do it? Well, we can give you this farmer's program of six basic factors:

(1) Pre-planned reduction of overhead expenses.
(2) Buys all corn for feed, instead of raising it himself.
(3) Maintains complete sanitation methods.
(4) Vaccinates young pigs promptly after weaning.
(5) Operates a large production schedule every year.
(6) Good feeding methods—Michigan State and Purdue formulas.

Mr. Swihart built his success on these planks over a period of more than 22 years—prosperous years and lean years. Whether you are a large operator or a small one, you can do it too, if you stick to the factors in the Swihart formula.

First in importance, Maynard says, is reducing the overhead operating costs to the absolute minimum. Mr. Swihart got this done by buying all his corn for feed instead of raising it. "My picket type cribs held 11,000 bushels of corn which I purchased from local farmers to feed for my 1953 crop of 1500 feeder hogs," he says.

This 11,000 bushels of corn was bought in the early part of the 1953 season, when corn could be purchased for $1.25 per bushel, instead of $1.45 later in the year. Keeping his corn in picket cribs saved storage overhead, and he had less investment in farming implements for planting and harvesting. His County Agent told him: "The amount of hired labor you save is tremendous. Besides, you have

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

lower fertilizer costs. The value of corn fed to hogs on open range is worth 7 cents a bushel as a fertilization agent."

The amount of profit depends largely upon how efficiently sanitation management is conducted. Mr. Swihart says: "Good shelter for brood sows and young pigs is of vital importance." For example, he has 50 coops on the premises, each coop providing warm and sanitary quarters, as well as feeding equipment for two sows and their litters. Each coop cost him $200 to build; that included carpenter's labor. About $65 can be saved on each coop if you do the carpenter work yourself. Present cost of building materials is $135.

The buildings are portable and easily moved from spot to spot by tractor power. The doors afford ample ventilation. Heat lamps are used in winter for young pigs.

Another farrowing unit is in a large barn on a neighboring farm. It contains 15 pens on the ground floor, compactly arranged in one end of the barn. Each pen has a guard rail for little pigs. They are kept there from 1 to 3 weeks.

Livability is high, because pigs are kept warm and dry. Mr. Swihart watches litters closely for appearance of disease. He believes that the time to stop disease is before it starts. So all coops and pens are kept clean. A hired man hooks a farm tracton on a coop and pulls it to the automatic water system, where he uses a 25-foot rubber hose, with a 4-foot metal pipe for a handle and a stiff scrub brush fastened on the end. A hole bored through the stiff brush permits water to flow through it from the well. After the coops are thoroughly scrubbed, they are sterilized with lye water, before other sows and pigs are put in. Lye is the most effective and economical insecticide known, and has kept the herds free from most diseases.

After removing the little pigs from the barn pens, they are transferred to field coops, in a group. Separate water tanks with drinking fountains are provided. Also, a self-feeder is included.

After weaning, the pigs are turned out on range, usually on the 117-acre river farm, where they can obtain good drinking water. But in the meantime, while pigs are still in the group coops, water is hauled from the home-farm water system, 3 miles away, in a 540 gal. water tank on a truck. Maynard says hogs make 10% faster gains by having drinking water within 10 feet of feeding box, during suckling period.

Mr. Swihart's breeding stock consists of 120 sows and gilts, and 8 boars, as of last spring. When

I counted the pigs, between two weeks and six weeks of age on the two farms, the River farm of 117 acres and the Home place of 80 acres, there were 800.

During the fall months Mr. Swihart permits his sows to farrow outdoors in the woodlots. This gives healthier pigs than inside close confinement. When cold weather comes, they are all put inside. During summer they are kept on alfalfa pasture, and fed a mineral mixture.

Mr. Swihart favors criss-cross breeding. He believes cross breeding produces pigs that gain 10 per cent faster. In his herd you find Hampshires, Durocs and Poland Chinas. While he raises no corn, he does keep some fields in alfalfa.

Feed for the sows during gestation is comprised of ¼ pound of good supplement each and enough corn to keep them in good flesh. In addition, minerals, based on the Michigan formula; Iodized salt, 30.6 parts; bonemeal, 31.6; limestone, 31.6; ferrous sulphate, 2.1; magnesium carbonate, 3.0; coppersulphate, 0.2; potassium carbonate, 0.2; magnesium sulphate, 0.5; zinc oxide, 0.1; cobalt chloride, 0.1.

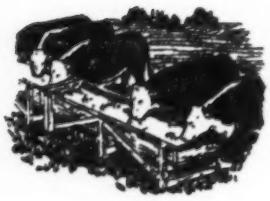
This mineral formula is absolutely necessary for health and thrifty gains of pigs, Mr. Swihart declares.

Feed for his little pigs is a mixture of 1400 lbs. corn, 400 lbs. wheat, 50 lbs. soybean oilmeal, 25 lbs. fish meal, 50 lbs. dried buttermilk, 100 lbs. alfalfa meal, 5 lbs. mineral salt (as detailed above), 10 lbs. limestone, 10 lbs. bonemeal, 12 lbs. antibiotics, and 80 lbs. meat scrap.

Mr. Swihart has his feed ground and bagged at the community elevator. However, he mixes his own supplements at the barn, using one of his farm tractors for power. He feeds his hogs twice a day. He breeds his sows twice each year, having carefully selected replacement gilts, sows and boars from herds that are free from disease—when he buys from outside. He breeds his sows in October and November to farrow in February, and in April to pig in August. Such hogs usually hit the high market. They are mostly sold to local packers, close to his farms.

Regardless of price, high or low, Mr. Swihart stays in. He definitely does not favor a jumping-in-and-out method of operation. Hog raising has its ups and downs, as well as any other phase of farming, but if you become discouraged and drop out when prices are low, when they advance again you are out of hogs. Then it takes too long to get back into production again. When prices are good in one year, and your production is high, you will make enough profit to carry you over the bad periods.

# Stilbestrol Feeding Means More Beef for Less



**Results are most promising. Profits per steer jump $21.00 and more . . .**

Condensed from Nebraska Farmer

A NEW cattle feed ingredient which in 100 days can put an extra 50 to 75 pounds of beef on a fattening steer for an investment of $1 or less is now available to cattle feeders.

The Agricultrual Products Division of Eli Lilly Company, Indianapolis pharmaceutical manufacturer, has announced that the growth-stimulating 'Stilbosol' (Diethylstilbestrol Premix, Lilly) is now available to qualified feed manufacturers for addition to feed formulas.

Advance orders indicate that the synthetic hormone premix will be included in thousands of tons of supplement fed to cattle on the nation's drylots.

The discovery of the growth-stimulating effect of oral diethylstilbestrol on both steers and heifers was announced last February by Iowa State College, where Dr. Wise Burroughs, C. C. Culbertson, and their associates in the animal husbandry department conducted the basic research. The Lilly product is the first to become available to the farmer and feeder in cattle feed supplements.

### Small Amounts

'Stilbosol' is being marketed in 10-pound bags (four to a carton) and in 50-pound bags. A 10-pound bag of premix is added to a ton of feed supplement. When it is scientifically distributed through the feed, the daily ration of 2 pounds per head provides 10 milligrams of diethylstilbestrol. This is the amount which gave best results in the Iowa experiments.

Nearly 100 feed manufacturers, including most of the top feed producers in the country, already have made supplemental applications to include the die-

Reprinted by permission from Nebraska Farmer, Lincoln, Nebraska

thylstilbestrol premix in their formulas. The applications are supplemental to Lilly's effective new drug application.

The feed manufacturers have been impressed by field trials of the premix by cattle feeders. These have demonstrated that the results obtained in research by Iowa State and Lilly can be duplicated or even exceeded in commercial drylot feeding operations.

A summary of Iowa State and Lilly research studies shows that oral diethylstilbestrol in proper amounts:

1. Cut feed costs by 2 to 4 cents per pound of gain.
2. Increased daily gains by ½ to ¾ pound.
3. Produced good to choice beef for as little as 18.3 cents a pound, based on feed costs during the period from October 23, 1953, to February 12, 1954.
4. Boosted the profit margin per steer as much as $21.90.

Some commercial feeders report even better results. Donald Mackay, an Illinois cattle feeder with twenty-six years' feedlot experience, is so enthused about his results from feeding the premix that he is enlarging his feeding operations for next year.

Mackay, who operates 860 acres near Mt. Carroll, Illinois, put 116 head on test, with 10 per cent placed in a control group which received identical rations except for synthetic hormone.

"The stilbestrol-fed cattle," said Mackay, "put on the biggest gains I've seen in twenty-six years of feeding cattle—3.46 pounds a day. The gains of these cattle exceeded the control animals by slightly more than ¾ pound a day, and my extra profit per head was $27.15.

Another cattle feeder, Jim Todd, who owns several ranches around Nowata, Oklahoma, also reported increased gains of ½ to ¾ a pound daily for diethylstilbestrol-fed cattle. Todd said that the cattle were fed under the worst conditions of 110 to 118-degree heat, with many getting foot rot, yet they put on an average of 2.27 pounds a day. Feed costs averaged 18.68 cents.

Todd, who had four years' experience with injecting diethylstilbestrol pellets into cattle as a growth stimulant, said the oral use of the synthetic hormone overcomes objections to the injection method, such as high tail-heads and excessive riding.

A. A. Danielson, who operates feedlots at Leland, Illinois, fed rations which were identical except for diethylstilbestrol to two groups of seventeen steers. The hormone-fed animals put on an extra .58 pound a day at a savings of 2.13 cents a pound of gain and yielded an extra profit margin of $18.84 a head.

# The 7 Ds in a Top Sheep Enterprise

**A skillful sheepman outlines his program for success and gives you the details . . .**

Condensed from Missouri Ruralist
*Carl Eiche*

When Bonnard Moseley starts talking about raising sheep, he thinks in terms of 7-D. While his farm, near Graff, Missouri, may not be a showplace, his management practices are highly regarded.

The 7-D's he makes reference to are management practices he recommends to a would-be sheep produced. They are:

1. Dip 'em.
2. Drench 'em.
3. Dog and wolf control.
4. Dock and castrate at an early age.
5. Day and night attention while lambing.
6. Diet — Proteins, vitamins, and minerals.
7. Drive 'em from pasture to pasture every two weeks.

Like most successful sheep producers Mr. Mosely would recommend that no one enter the business unless he likes being around and working with the woolly creatures. He has raised sheep since he was a high school student at Mountain Grove.

After a couple of years of college, he taught 4 years, then decided to start farming in 1948.

After working his father's farm 3 years, he bought his 250-acre farm near Graff in 1951. He started with 30 native ewes in 1948, had built up a flock of 75 by 1950. When he moved to his farm, he sold the natives and bought 150 Western ewes for a fresh start.

### One Man's System

Each man develops his own system of sheep production thru the years, this is Mr. Moseley's:

Before turning bucks in with ewes in September, he flushes ewes with ground corn and green pasture for 10 days. Ration of

Reprinted by permission from Missouri Ruralist, Kansas City, Missouri

¼-pound corn is increased to one pound at end of flushing period. If green pasture is not available, he uses silage in ration. Ewes are drenched with phenothiazine and lead arsenate for stomach, nodular, and tapeworms during the flushing period. Drenching is done 4 or 5 times each year unless seasons are so dry that less worm trouble occurs.

While ewes are getting a flushing ration, rams get one pound of bran or oats. They usually are sheared just before breeding season and are kept in shade all day.

Ewes are tapered off the flushing ration for 8 or 10 days after breeding season. Rams are turned in with ewes at night in September. Lambing season used to be planned for March but was changed to February after the last 2 drouth years made it difficult to put early gains on lambs.

Winter ration for ewes is one-fifth pound cottonseed cake or two-fifths pound Purdue Supplement A, 1 pound legume hay and 4 pounds corn silage. He says he has not had to condition ewes for lambing when using this ration. A mineral mixture of 2 parts bone meal and one part salt is fed free choice.

Pastures are rotated every 2 to 3 weeks; Mr. Moseley thinks this helps control the worm problem as well as making pastures last longer.

At lambing season, Moseley uses 50, 4-by 4-foot panel gates to pen ewes in his large barn. Using this system, he can house 30 ewes at a time. Ewes lamb in pasture or lot and are taken into the barn immediately after lambing. Ewes with lambs are kept separate from expectants at all times. Besides his large barn, a hog barn serves as loose housing.

Good livability for lamb crop is due to vitamins and proteins in ewes' diets, he believes. He had 219 out of 225 lambs live in 1953. Exercise is very important for ewes also, he says.

While ewes are lambing, Mr. Moseley stays near the house. He tries to be with the ewes every 2 hours. In cold weather he takes a bucket of warm water, to dip lambs. He paints navels with iodine soon after birth.

Docking and castrating take place at 5 days to 2 weeks. Mr. Moseley prefers a sharp knife for castrating and uses pruning shears for docking.

Lambs and ewes go on small-grain pasture at 2 weeks. From small grains they go to native grass, then to Sudan. Coming off the Sudan, lambs go on ration of 4 pounds of silage, ¼-pound oats,, ¼ cottonseed, and ground corn. He figures rate of corn increase by reading Morrison's "Feeds And Feeding" and feeds

until they reach consumption rate of 1¾ pounds of feed per day.

### Hits the Top Market

His lambs hit the extreme top market and averaged 101 pounds one year. This market weight is contrasted to 60-pound average weight coming off Sudan pasture. He had a lamb crop of 219 from 168 ewes for 135 per cent production as over two-thirds of the ewes had twins.

Wolf and dog problem is partly taken care of by keeping salt in the lot. Ewes and lambs come in every night, are penned against attacks. Flares have been used to some advantage also.

Shearing usually takes place about May 1. Sheep have sheared 8 pounds of wool on an average and have had 10 pounds as yearlings.

A 5-year plan for crop fertilization has seen an increase in fertilized acreage of 15 acres first year, to 48 acres second year, and 65 acres by 1954. Corn usually is fertilized heavily; a crop of wheat or Sudan follows as a pasture crop. He has been able to get fertilizer cost back each year by using this 2-crop system.

A bottoms field produced a tremendous crop of Piper Sudan last year. The 7 acres received 3 tons lime, 200 pounds 0-60-0 commercial fertilizer; 200 pounds 0-0-60, 200 pounds ammonium nitrate, and a starter fertilizer of 80 pounds 8-24-8. Originally intended for corn land, it was seeded to Sudan because of drouth.

When grass grew to one foot height, Mr. Moseley turned 171 lambs on the field, at 5 weeks. In August, he turned in 165 ewes and 22 head of cattle as well. Altho the 355 head of livestock grazed the small acreage for 2 weeks, much of the grass was wasted, Mr. Moseley says. After 2 or 3 weeks rest, the lambs were turned back in for 60 more days of grazing.

For the last 2 years, Mr. Moseley has had 8 acres of oats for hay and last spring, he put 125 tons of wheat in his silo, with molasses preservative. He pastured 15 acres of small grains completely and harvested 25 acres.

The reasons Mr. Moseley gives for getting into the sheep business are: He thought sheep could stand drouth quite well; there is less initial investment and a quicker turnover on the investment; sheep can be wintered cheaper than other livestock; they eat weeds and brush and take manure over poorest and highest land.

**Culling poor-producing dairy cows will keep them from eating up the profits from good producers.**

# Veterinarian's Notebook No. 14

# *What You Can Do About BLOAT*

**What to do and what not to do with a "blown" cow. Here's information (from England) you may need . . .**

Condensed from Farmer and Stock Breeder

WITH spring, veterinarians all over the country expect the telephone to ring at any moment and a breathless voice to say "Will you come at once, I've got a cow blown." Every year it happens, and every year animals die from this complaint—and in a matter of five or ten minutes in some cases.

By bloat is meant the distension with gases of the large stomach or rumen which occupies the left flank of the animal.

There are special cases of bloat such as those which occur during choking when the gullet is stopped-up with a potato or small turnip and the gases from the rumen cannot escape through the mouth in the normal way.

There are also those cases, however, which are the chief worry. The bloat which gives rise to the greatest concern is that which is associated with the type of feed which the cows are receiving, and which is a herd problem.

### Rapid Action

This type of bloat is most commonly seen when cows are first turned out on to fresh spring grass. Within a matter of minutes half a dozen or more may be blown up like footballs and they go down, gasping for breath, and die unless rapid relief is forthcoming.

Death is usually due to asphixia but there are cases in which the rumen actually bursts inside the cow and then death is due to shock.

Types of pasture, seed mixture, protein content, weather, soil types and fibre content, have all been investigated to find the cause of bloat.

Now, it is generally accepted that most cases of bloat occur when animals are turned out to young, actively growing pasture with a low fibre and high pro-

Reprinted by permission from Farmer and Stock-Breeder, London, England

tein content. In this respect clover is looked upon as Public Enemy No. 1.

It would appear that dairy cattle are far more susceptible to bloat than beef cattle, and since the condition is more commonly found on quick-growing herbage, then weather conditions are all-important, too. Damp, warm weather is the time to look out for bloat.

The general cause of bloat is fairly simple. After a winter on hay and good straw and concentrates, the animals are suddenly turned out and allowed to fill their bellies with young protein —rich grass with hardly any fibre content to aid digestion. The young, succulent grass ferments rapidly in the rumen and large quantities of gas are formed.

### Frothy Bloat

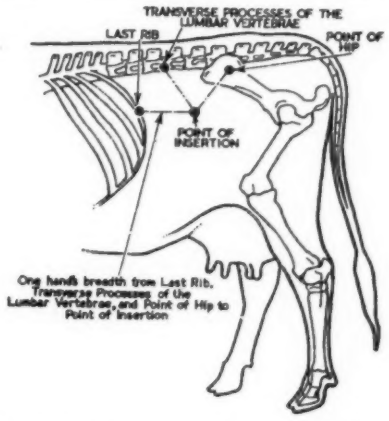
In some cases the gas occupies that space in the rumen above the food-mass but in other cases the gas appears to be well-mixed up with the rumen contents. This latter condition is known as frothy bloat, and is far more difficult to treat.

Some cases die so rapidly that treatment is out of the question. The majority of cases, *however*, are treatable though not always successfully.

First and foremost get the cows off that pasture at once and back into the yard or shed. While that is being done, telephone your veterinary surgeon. Drenching has its dangers, especially if the animals are gasping. You can choke them in no time, so be careful.

I would suggest you ask your veterinary surgeon for half a dozen "bloat-drenches" to keep by you for emergencies. Then at least he will know what has been poured down the animal's throat.

The use of the trocar and canula (a hollow metal tube


TRANSVERSE PROCESSES OF THE LUMBAR VERTEBRAE
LAST RIB
POINT OF HIP
POINT OF INSERTION
One hand's breadth from Last Rib, Transverse Processes of the Lumbar Vertebrae, and Point of Hip to Point of Insertion

Relief of bloat by puncturing the rumen with trocar and canula, or any other sharp-pointed instrument, is a job for the veterinary surgeon; but it can be performed by the amateur in cases where a vet is not available. The sketch shows the place at which the puncture should be made. Failing all else, a pocket knife will do the job.

holding a sharp steel stilletto which is plunged into the rumen to allow the gases to escape) is dangerous in unskilled hands and in frothy bloat particularly, you will do more harm than good.

Plunge it in the wrong place and you will kill the cow. You will get the same result if you allow any rumen contents to flow into the abdominal cavity.

### Job for the Expert

However, I have no doubt that some farmers will try it; and if they are determined to have a go in spite of all my warnings, then they might as well plunge the instrument into the right place. The correct spot is a handbreadth from the point of the hip, the last rib and the transverse process of the lumbar tebra shown in the sketch. However, be it on your own heads. I, personally, think it is a job for a qualified man.

Prevention is the thing with bloat. Just remember that the animal's system has got to get used to the change of diet slowly.

### Five Ways To Fight Bloat

Turn the animals out for a short time each day to start off with and keep your eye on them.

Feed some hay or good straw to them before turning them out.

Scatter some hay or straw on the strip of meadow on which they are going to graze.

Try mowing the grass and letting it wilt for a short time before letting the animals eat it where it lies.

Pay attention to your seed mixture. The addition of fescues to provide more fibre and roughage will often help to eliminate the risk of bloat.

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*If you want to purchase a trocar and canula, send* $1.50 *to Farmer's Digest, Fort Atkinson, Wisconsin. We will refer your order to a supply house.*

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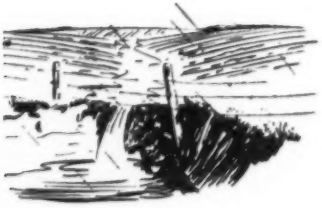
## Feed Cows Good Forage For Efficiency, Economy

For economical and efficient milk production, feed cows about 2½ pounds of high quality forage for every pound of grain. U.S. Department of Agriculture studies reveal that the cost of milk increases sharply when more grain and less forage are fed.

But the USDA nutritionists stress the fact that savings possible in feeding more forage depend to a large extent on high quality in the pasture, hay or silage fed. The forage must have a high level of total digestible nutrients that make it more than just a "cow filler."



# Load by Load, They Put Eroded Soil Back!

**A remarkable demonstration staged by FFA and 4-H Boys proved the worth of contour farming . . .**

Condensed from Soil Conservation

*J. M. Rabdau*

IN what is believed to have been the first field demonstration of its kind, 50 FFA and 25 4-H youngsters, and about a dozen GIs dramatized the heavy loss that farmers and ranchers suffer when uncontrolled runoff sweeps over their sloping fields, cuts channels and carries away many tons of topsoil.

These young volunteers bent to their task at the business ends of shovels and at the handles of wheelbarrows, and put the topsoil, *at the rate of* 93 *tons per acre,* back where it had been gouged out by last winter's storms.

Four hundred farmers, and others deeply interested in soil and water conservation, saw the boys do the job and learned what erosion means. Through newspapers, radio and TV, many other farmers, and almost everybody else in the Latah district and adjacent areas, came to realize that what appears to be slight washing quickly adds up to terrific soil and crop losses per acre. The demonstration reached right down into their pocketbooks.

The storm damage was done in 4 months last winter at the Snow Brothers farm, south of Moscow, Idaho, where the demonstration was held. It extended across the slopes of a 35-acre field. The restoration was made on a tenth of an acre, where the slopes ran about 25 per cent. The damage occurred because the operators had worked the soil too finely, and had seeded it in drill rows running up and down the slope, rather than on contour and across the slope, the way the Snows generally handle their

Reprinted from Soil Conservation, Washington, D. C.

cropland.

In the demonstration, 114 wheelbarrow-loads of topsoil were recovered from where it had been deposited at the base of the slope. It was shoveled into the barrows, pushed up the hill on planked runways, and put back in place, with careful compaction, thus restoring the face of the land to a condition under which normal operating and production methods can be resumed without interruption.

This much topsoil meant moving 29,416 pounds of earth, a net of 18,611 pounds of soil after the 30 per cent moisture content had been deducted. These are banker-exact figures. The agricultural representative of a Moscow bank, and the manager of another Moscow bank, did the weighing at tested scales when the boys moved up the grade with their loads and when they came back with the empty barrows.

Twenty-five man-hours of work were required in the restoration operation. This indicates that a total of 1,093 man-days work (3½ man years) would be needed to do a like job over the entire 35 acres. At $10 per day, it would represent a cost of $10,900.

On top of that, there is another angle in the loss that erosion causes. The technicians made a test for nitrogen content and found 1.435 pounds in one-tenth acre. Since 2 pounds of nitrogen are required to produce a bushel of wheat, according to calculations by Roy Harder, University of Idaho agronomy department, the loss of nitrogen (1.435 times 18,611, the net loss of soil) gives a practical idea of the total loss per acre when productive farmland is eroded. Orval Snow, one of the farm owners, summed up that situation in this comment: "It's what you get when you don't farm on the contour."

The idea for a soil loss and recovery demonstration was hatched out by John T. Nicholas, a member of the Soil Conservation Service field unit that assists the Latah Soil Conservation District. He organized his associates in the unit into a committee, of which he was chairman. They enlisted the sponsorship of the district supervisors, who helped gain the cooperation of newspapers, radio and TV, the Moscow Chamber of Commerce, County Agent Elbert McProud and the Extension Service, the Agronomy department of the University of Idaho, and others. Included were farm machinery and supply dealers, lumbermen, millmen and builders, grain growers and commission men, and other businessmen, who supplied tools, equipment, materials needed for the

work, prizes, and refreshments for workers and spectators. The Moscow high school band played lively tunes that kept the young workers on the move, and the spectators on their toes. Boy Scouts aided in parking cars.

Chapters of the Moscow, Troy and Genesee Future Farmers of America, the Latah County 4-H clubs, and the GI Agricultural Training Classes at Troy and Moscow provided the 90 volunteer workers.

All in all, it was a bang-up achievement, and spoke well for the teamwork of work unit and district.

## What's Your Milk-Feed Ratio?

Watch the milk feed price ratio—it will help cut costs.

The price-feed ratio is the number of pounds of feed that a pound of milk will buy. When the ratio is high, feed is cheap relative to milk. And it works vice versa.

That means, said Dale Butz, Farm Economist, that individual cows should be fed on the basis of production.

Many good dairymen, he indicated, are feeding about a pound of grain for every five or six pounds of milk. The milk-feed price ratio now, according to Butz, would indicate that more feed than that would be unnecessary unless the dairyman has especially good cows.

But he pointed out, if milk prices increase relative to feed, it may pay to feed slightly heavier. And if feed prices move up, it may pay to stretch the feed a bit—depending on the quality of roughage, the economist indicated.

*Michigan State College*

## Economist Likes Cattle Future

Now is the best time in several years for a person to go into the beef cattle business, according to M. S. Williams, head of North Carolina extension farm management and marketing.

Predicting that incomes would continue to be high, more people will be working, and will have more money to spend in the next five years, Williams optimistically said that he expected beef cattle producers to have a better year in 1955 than in 1954.

Although saying that beef cattle would probably cut into some of the other agricultural crops that require more labor, he warned the cattlemen they could expect more competition from the poultry and pork industry.

# Pampered Pigs Produce Profits

**Better than 8 weaned feeders per litter from this farrowing house . . .**

Condensed from Electricity On The Farm

*Allen M. Ellison*

LESLIE MYERS and Son, Kingman, Indiana, farm 600 acres of fertile land. As a side line, they farrow about 400 litters of pigs a year. In 1953 they sold 3,000 weaned feeder pigs to other farmers, fed out 300 for market, and kept 100 for breeding stock.

Losing pigs or a sow, in hot weather, does not spell fun or profit to any farmer. Neither does losing them in cold weather, due to chilly, damp, farrowing houses. These things were taken into consideration over seven years ago when they went into the pig hatchery business.

The farrowing house they built at that time is 114' long, 25' wide, 13½' high at the ridge, and 5' high at the eaves. The central alley is 5' wide and there are fifteen permanent farrowing pens on each side. Twenty-eight of these pens, which are 6'-8" wide and 10' deep, are used for farrowing. One of the others is used for washing sows and the pen across the alley from it is used for ground corn cob storage.

There is also a feed room. Feed is scooped from a wagon into a small vertical elevator which dumps the feed into a bin. Ground cobs drop from the same elevator into an auger that moves them to the cob storage pen. This small elevator saves a lot of work in handling feed and cobs. The farrowing house also has its own ¼ hp pressure water system to provide plenty of running water.

To lick the cold and dampness in the winter, the Myers use infra-red heat lamps over each sow and her litter. One infra-red lamp is suspended over

Reprinted by permission from Electricity On The Farm, New York City

each pen, at a height six inches above the standing sow's back. Ventilating fans carry off excess moisture, and supplemental heat is provided for those working in the farrowing house, as well as for the sows and pigs.

Mr. Myers says that, because of the supplemental heat, he does not find it necessary to partition a corner of the pen or provide a lamp at a lower level for the pigs. He does not use guard rails in his pens. Mr. Myers believes that a sow will nose her pigs away and will not lie down on them, if she can see where they are. To give the sows plenty of daytime light to see with, a 20" x 26" window is installed in the roof over each of the thirty farrowing pens. For night light, one hundred watt bulbs are installed over the central alley at the dividing wall of every other pen.

For sanitary reasons, the Myers built their pens with concrete floors, which slope toward gutters in the center alley. Pens have tile walls and steel fronts. On the floor of each pen there is a 2" x 4" wedged between the two sides so that the front third of the pen is reserved for the mess of watering and feeding. The ground corn cob bedding in the back two-thirds of the pen, remains clean and dry.

Supplemental heat is provided by an automatic oil furnace in one end of the farrowing house. Heated air is forced through an overhead duct extending two-thirds of the way along the house. A regular furnace fan, driven by a ¼ hp motor, handles this air. It circulates through the entire building and returns to the fan. The furnace is thermostatically controlled to maintain a minimum winter farrowing house temperature of 45°.

As the farrowing house is very well built, and with about thirty sows and their pigs sharing it, the air could soon become foul and heavy with moisture. To eliminate this problem, two 10 inch exhaust ventilating fans are installed in the peak of the house over the center alley. They run constantly, carrying off any excess moisture and providing one complete change of air every fifteen minutes. This combination of fresh, dry air, direct infrared rays, and supplemental heat provides a very healthful and invigorating set of living conditions for the sows and pigs.

When summer rolls around, a different set of air conditioning problems prevail, heat and moisture. But the Myers are ready. Their two 10 inch fans are never turned off in the summer, and the doors at each end of the farrowing house are regulated to keep down the temperature and prevent drafts. To provide individual cooling when needed for

any sow, a short petcock in the water pipe can be adjusted to make a fine spray which will settle over the sow and cool her. The ventilating fans then evaporate the excess water.

For those few hot still days, when more ventilation is needed, the Myers have installed a 1/3 hp motor driven 30" exhaust fan to help move air through the building. With this and the two smaller fans operating, the air is changed every 3 minutes.

The Myers have never had trouble from heat in their farrowing house, even though the outside temperature has been over 100° several days every year. Max Myers said that adequate and continuous ventilation is certainly a key to profits in raising healthy pigs in a central farrowing house.

In 1953 the Myers used 8,962 kilowatt hours of electricity in their farrowing house, and produced 3,400 weaned pigs. This amounts to a little less than three kilowatt hours per pig! With this, they provide heat, both from the lamps and from the furnace; ventilation; running water; and a means of handling feed and bedding.

## Rate of Lay Determines Poultry Profit

It's the "rate of lay" that makes money for the poultryman, declares W. R. Van Sant, Arizona extension specialist.

There is more profit per year from 2,000 hens laying 215 eggs per bird per year than from 4,000 hens laying only 180 eggs per bird per year. If eggs are worth 50 cents a dozen and feed costs $100 per ton with other expenses as 40 per cent of total costs, here's what you come out with. With 2,000 hens averaging 215 eggs you get 430,000 eggs or 35,833 dozen per year.

Feed requirements per bird will amount to 92 pounds per bird or 92 tons for the flock. With total costs coming to $15,333.34 and total income at $17,916.50, the profit from the 2,000 high-producing hens will be $2,583.16.

If you have 4,000 hens averaging 180 eggs per year, they will lay 60,000 dozen eggs. This will amount to $30,000. These birds will eat 174 tons of feed averaging 87 pounds per bird per year. Total costs wil come to $29,000. The profit will only be $1,000.

Poultrymen don't have to reduce the size of their flocks, but they can get increased profits by increasing the production per bird. If that 4,000 bird flock had averaged 215 eggs per bird, the profit would have been five times as much or $5,166.33.

*University of Arizona....*

# Agriculture and the Atom

**Radiation of plants at the Brookhaven laboratory has shown promising results in new, improved varieties for farm and the garden . . .**

Condensed from Rural New Yorker

THE United States is sponsoring research in the development of new types of corn, and other food and feed crops, by radiation with radioactive cobalt, a source of gamma rays.

At the Brookhaven National Laboratory, at Yaphank, Long Island, Dr. W. R. Singleton is submitting corn plants to radiation of various intensities to cause heritable changes in their genes.

Genes are known to be located on the chromosomes of the individual cells of all plants and animals and are recognized as the determiners of both inheritance and development of individuals. Corn has 10 pairs of chromosomes; the number of genes is known to be much greater.

In the middle of a 10-acre field (called the gamma field) at Brookhaven, a stainless steel contraption is constructed to house —and to raise and lower—a piece of 1,800-currie radioactive cobalt, the source of radiation. Corn and other plants and trees and shrubs, are planted in concentric rings and arcs one meter apart around this source. Radioactivity is greatest near the center—most plants are killed within 20 feet—and its intensity decreases with distance. The cobalt can be lowered into a lead "pig" in the ground whenever workers enter the field, which is fenced, and whenever necessary to control the quantity of radiation.

Radiation causes change in the genes and chromosomes of plants. These are expressed as changes in their actual appearance. For instance, a red carnation grew out of a patch of white ones in the gamma field and, later rooted for propagation, produced

Reprinted by permission from Rural New Yorker, New York City

more red carnations. The kernels of corn change, too, in color, sugar content, surface texture, fullness and other characteristics. Short-stalked sweet corns have been produced at Brookhaven, and Dr. Singleton thinks they will have commercial use; some of the short corns are high yielders. In field corn, the short varieties would be much easier to harvest for both grain and silage.

Gene changes are known to occur and transmit naturally; these are called spontaneous mutations and occur at a rate of less than one in a thousand corn kernels. What radiation does is to increase the number of mutations in the plants and thereby increase the possibility of economically valuable changes. The number of desirable mutations both from natural causes (due, in part, to so-called cosmic rays) and the artificial gamma radiation is extremely small. Because the total number of gene changes is increased by the gamma radiation, the number of desirable changes is also increased.

To control the periods and lengths of radiation, Dr. Singleton grows some of his corn in metal pails that can be moved in and out of the gamma field at will. Plants growing in the field are subjected to radiation at identical times; there is no practical way to direct the radiation to particular segments of the field at different times. So the pails provide a means of radiating the corn at different stages of its development and for desired periods of time. It has been found that the corn's stage of maturity at the times of radiation is critically important to the number of mutations; more occur as the ears are forming. More changes have been found to occur, too, from morning radiation.

The pollen of corn is the chief instrument of change in Dr. Singleton's work. It is collected from radiated plants and is applied to ears of plants that receive no radiation—these grow in regular farm fields on the laboratory grounds. This method allows fairly accurate measurement of the effects of radiation and also increases the probability of mutations because pollen grains are much more numerous than kernels and silks.

Experiment stations and other agricultural institutions and concerns are sending seed and plants to Brookhaven for radiation. What they are looking for are bad mutations—one bud of a single plant—for propagation. (The widely-grown Golden Delicious apple came from a single-bud mutation; Stark Brothers were reported to have paid $5,000 for the branch of one tree.) Seeds and plants are, after radiation, returned to the institutions

for growth and propagation. Apples, peaches, grapes, berries, pine trees and sugar maples are among those plants and seeds sent to the laboratory.

Dr. Singleton thinks that in perhaps two years he will be able to develop a strain of corn that is resistant to leaf-blight and therefore much higher yielding. He foresees, too, the development of peaches and apples that can be stored and marketed better. He believes that disease-resistant and higher producing animals can be bred by submitting spermatoza, particularly in artificial insemination, to radiation for gene changes. Wools improved in texture and fleeces heavier and more uniform, he thinks, may come from radiation methods of changing inheritance.

Such valuable corn varieties as the male-sterile one recently created by Dr. D. F. Jones at the New Haven Station (it makes the production of commercial hybrid corn simpler) may be developed. The shorter, higher yielding silage corn may become a reality. Efforts with tobacco and potatoes also promise varieties of higher and more economical yields.

The Brookhaven National Laboratory is operated under contract by a private institution, Associated Universities, Inc., (Columbia, Cornell, Harvard, Johns Hopkins, Massachusetts Institute of Technology, and Princeton, Pennsylvania, Rochester, and Yale Universities) for the U. S. Atomic Energy Commission. The work in plant and animal breeding is not classified for security and the workers on the projects have "plenty of liberty." They publish freely and, as Dr. Singleton points out, "the biology department is run just like that of any good university."

## Do Your Cows Qualify?

Marvin E. Senger, dairy specialist, says if each of your cows meet the following qualifications you're in the dairy business to stay:

1. She must be an efficient and economical producer of a clean wholesome product.
2. She must be sufficiently pure in her genetic make-up to transmit her desirable characteristics to her offspring.
3. She must be strong and healthy and wear well for many years.
4. She must be a regular and consistent breeder.
5. She should, in addition to her usefulness, have beauty of general appearance and body condition.

# Turkey Breeder Selection Simplified

**This English breeder has devised a system of scoring potential breeders. . .**

Condensed from Turkey World

*Murray Hale Witham,* Essex, England

PERHAPS the most difficult problem in devising any system of pedigree breeding is to find some method of evaluation which will put all the numerous factors on equal terms.

I had this problem very much in mind when devising my present system. It has now been used, with slight variations, on several turkey breeding farms in this country.

### System Is Practical

What I have done is quite simple. It is to give each factor a scoring value—according to the importance of the particular gene in the makeup of the stock.

These different scores are placed to the credit of the family concerned. Thus, I am able gradually to build up a picture of a family, in comparison with other families, on the basis of the total score for all factors.

The main factors I have to take into account are hatchability, persistency, viability and conformation. The first three are relatively simple. Conformation involves a number of different points, and is not quite so easily disposed of.

I work entirely on flock averages. Comparison, in every instance, is between birds of equal age and environment. Persistency is based on the percentage of eggs laid over 100 days, worked out against the flock average. Hatchability is based on the same period and in the same way. Viability is based on the number of poults found at 16 weeks, when we grade. All missing numbers are debited as deaths, although a few will, of course, be due to lost wingbands.

I have to work a system that can be operated in the field

Reprinted by permission from Turkey World, Mt. Morris, Illinois, November 1954

with the minimum of disturbance to the farm routine. After all, pedigree work must be done on practical and economical lines to be of any use to the average breeder.

All these figures are multiplied by 10. Of course, working in averages, some of the values will be plus, and some minus, at any stage. The final figures are then added, and the resultant total is called the **breeding potential.**

Before I go on to discuss the system of grading, which is the heart of my pedigree work, let me show what happens. We will take the score of an actual bird from my books.

Here is hen number 251 picked at random. She shows the following values for the different factors: Persistency +11.6; hatchability +6.5; viability —5.4; conformation +1.85. Now, let's multiply these by 10 (by simply removing the decimal point, of course), and we get 116, plus 65, minus 54, plus 185. This makes a total of 312. This 312 is the breeding potential. It represents a value by which the hen, and her family, will be judged against other breeding lines.

### Grade at 16 Weeks of Age

I base my methods firmly on a grading carried out when the poults are 16 weeks old. At this age, it is possible to discover not only which families have the best early growth rate, but also which are likely to finish better fleshed and earlier than others.

I find that I can foretell with considerable accuracy the killing qualities of a bird at 26 weeks by grading at 16 weeks. Weight, thigh and breast width, and keel and feathering qualities will be approximately doubled at 26 weeks.

Some families are far behind others at this 16-week grading. These will take longer to reach maturity, and therefore cost more to rear. This is an economical point of considerable importance. We are finding that birds grading out well at this age will have a better feed conversion rate than others.

### Early Grading Very Important

This is the only way I know of getting a family feed conversion picture under practical farm conditions. Therefore, it will be seen that this 16-week grading is something that can be of great use to the pedigree breeder, and ultimately to the whole industry.

In the field, one has to contend with all sorts of conditions, including variation in quality of help. Therefore, the grading system must be such that it can be carried out swiftly, comfortably, and accurately by the field staff. All calculations are done in the office at a later date.

I use a little pad of tear-off slips on which the actual

weights and measurements are marked in the field. These are torn off in the office and put in the file of each family. Every hen family at the end of the season has a little wad of these slips. The plus or minus figures are totaled, and then averaged out among however many progeny there happen to be . . . if 40, then the total is divided by 40, and so on.

### Special Table for Holding

I use a special holding table which I have devised for inspection of the birds. Shackels hold the bird's legs when it is laid on the table. The bird is graded for breast width, thigh width, texture, keel, and feather. The bird is next taken to the end of the table, where a spring balance is suspended from a metal rod. Here it is weighed before being released. The bird is suspended from the balance in a canvas sling. It is comfortable and does not struggle, and it is thus easily and accurately weighed.

From time to time, we make slight adjustments and alterations to the makeup of the actual grading slip. Some farms demand more emphasis on one factor than another, for various reasons. For instance, it would not do for heavy birds with narrow breasts to outscore broad-breasted birds with slightly lower weights. So a balance must be struck by scoring more heavily on the breast and less on the weight, and so on for any factor that needs emphasizing.

There is also a limit to the number of items which can be entered on one slip. In this country, skin color and texture are important . . . the appearance, in fact, of the dressed carcass. We try to grade on this dressed carcass angle, for we try to breed turkeys that can, if needed, be killed at 16 weeks and be in prime condition. This can only be done if families are selected for these points.

Therefore, we grade for texture, keel (length, straightness, lack of knob, etc.), and for pinfeathers. Grading is done in letters, A to E, and points are given to each letter. We find that our help understands this better than if we used point values.

The six factors I find generally suitable are weight, breast width, thigh width, texture, keel, and feathering. We used to have depth, but dropped it in favor of texture. There are several more factors that might be included, of course, according to the requirements of the individual farm, and the genetical makeup of its birds.

### Opinion Can't Be Avoided

A weakness of grading for texture, keel, and feather is that it rests on opinion rather than on any actual figures. I have been unable to devise a better way, however. I find that, if the grad-

ing is done by the same person on each farm, the results are good, and consistent.

I do not put forward this system as perfect, by any means, but it has the advantage of being flexible and reasonably accurate. The averaging is done in each group, of the same age and environment, and same sex. So a bird is compared entirely with its own group and not directly with any others. The comparison between birds of different ages and environments is only on the plus or minus average of their own group.

The actual points I use are as follows: Weight, 10 points per pound; breast, 100 points per inch width; thigh, 100 per inch width; texture and keel, graded from A to E, scoring 25 for A down to 5 for E; feather graded A to E, scoring 40 maximum. These point values can be altered, of course, to suit the ideas of any breeder.

## Pig Creep Feeding Produces Fast Economical Gains

Creep feeding of suckling pigs is becoming increasingly popular among swine producers as a means of producing fast economical gains, says J. H. Conrad, Purdue animal husbandryman.

Four keys for stimulating creep consumption include correct placement of creep, providing sufficient water, providing nutritious and palatable feed, and starting to creep feed early.

Available data indicates that pigs will consume at least three times more feed from a creep located inside the house adjacent to the sleeping area than from one located outside the house.

Water should be provided twice daily or continuously from the time pigs begin to eat dry feed. Up to five weeks of age, an average litter of eight pigs will consume one-third gallon of water daily, and from five weeks until weaning they will drink over one gallon of water per day.

An 18 per cent crude protein ration adequately fortified with vitamins and antibiotics will increase gains. When given a choice, pigs prefer a ration containing 10 per cent sugar in contrast to a ration with no sugar. Experimental data shows that sugar adds in stimulating early consumption. It is recommended that pigs be given access to a creep ration by the time they are seven days old.

In a recent Purdue University creep feeding trial all these factors were combined and as a result pigs 56 days of age averaged 45 pounds, reports Conrad. Furthermore, each pig consumed 42 pounds of a creep ration before weaning at eight weeks.

*Indiana Extension*

# "Fool's Gold" for Farming

**Better germination and seedling growth are most notable of promising new uses of vermiculite. . .**

Condensed from Farm Management

FLECKS of "fool's gold" can make a rock into a cherished possession for a child, and the same material is finding new uses in agriculture in the form of vermiculite or expanded mica.

Vermiculite is in common use today as an insulating material and as a substitute for sand in concrete and plaster. The promising new agricultural uses are three:

1) As a soil conditioner, primarily for band application to improve seed germination and seeding growth.

2) As a carrier for soil fumigants to control nematodes.

3) As a carrier for iron chelates to control iron chlorosis in plants.

Research finding on the last two are still quite limited, and commercial use so far seems to be restricted to particular types of application or geographical regions.

### Soil Conditioner

But use as a soil conditioner has been shown to have definite benefits wherever a combination of moisture conditions and soil structure create the kind of seed-crust that hampers germination and seedling growth. Researchers have learned that vermiculite can help correct this seedbed condition. When applied in a band over the normally planted seed, vermiculite becomes "stand insurance" at a cost of about $8 or $9 an acre.

To understand how vermiculite works, let's take a look at the material.

Mica is mined in a number of places in the United States. Most of us remember the "isinglass" window in the door of the old heating stove, and today mica is widely used as an electrical insulator. When you put a piece under a microscope, you see that it's composed of many layers. Between each of these layers there's a thin film of moisture picked up from the air.

Reprinted by permission from Farm Management, Los Angeles, California, December 1964

Apply intense heat to this material and the water turns to steam, and the steam pressure causes the flakes to expand. It expands as much as 15 times to produce a light, fluffy material that weights only six to eight pounds per cubic foot.

**Banded over seed**

When used on farms, this material may be laid down in a band and the seed planted in it, or it may be used as a banded covering over the seed. When a seed is covered with vermiculite, the loose, fluffy material provides an excellent medium in which the seed can germinate, send out roots or stem and obtain a quick start toward maturity.

Among research findings are those of Dr. W. D. Pew of the the University of Arizona. In these tests, begun in the fall of 1952, vermiculite was one of five soil additives tried with lettuce as the crop. The others included krilium, sulfur, gypsum, and flotal.

Pew points out that the nature of the conditions must be considered in interpreting results. Vermiculite is purely mechanical in its action; the others change soil structure through chemical reactions. Vermiculite is effective only where it is placed, while water movement and slow reactions may enlarge or build up the improvement by chemicals over a period of years.

**High germination**

With this qualification, the performance of vermiculite was outstanding. First-year test rows showed 62 plants per foot with vermiculite in a band above the seed, while seedling emergence for other treatments ranged from 22 to 32 plants per foot. Weather conditions were severe, with .75 of an inch of rain falling two days after planting

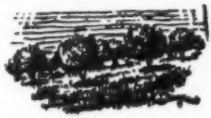
Vermiculite plots also showed early maturity and remarkable uniformity of heads; most common explanation was the uniform germination. But another factor may have some influence.

Vermiculite is used as building insulation because it transmits temperature changes very slowly. This insulating effect may be effective in protecting summer seedings against intense heat and early seedings against frost. It might also, of course, keep cold soil from warming up. But this has not proved a problem with some tests of tomatoes in Indiana.

There, the Kemp Packing Co. found that it got better results with direct-seeded tomatoes, with vermiculite banded over the seeds, than it did with transplants brought from the South.

Generally the best method of application is with a hopper on the seeder using a flexible spout to drop the vermiculite over the seed, according to the Arizona experiments.

# HOW TO TREAT STORM-DAMAGED ORCHARD TREES



**Check the temptation to pull them upright, or you may cause more damage. . .**

Condensed from American Fruit Grower

*Wesley P. Judkins,* Virginia Polytechnic Institute

HURRICANES Carol, Edna, and Hazel caused widespread damage to orchards in eastern United States. Fruit growers are now confronted with the problem of salvaging or removing the trees which were blown down.

The first thought of most fruit growers is to attempt to pull the trees back up and brace them until the root system becomes re-established. Previous experience with apple trees which have been blown down has demonstrated that many difficulties are involved in this operation. A large number of trees were straightened up and braced in Connecticut following the hurricane of 1938. It has been evident for a number of years that a considerable amount of this work may have been wasted effort.

It seems impractical to pull back trees which are more than 20 years old. This may be a good time to remove middle-aged and old trees which have not been too profitable in recent years. Young trees may be worthy of a salvage operation, but in many cases a vigorous young tree may make better recovery if left on the ground than when pulled to an upright position. This is particularly true if the ground was soft and the roots were twisted in the ground with relatively few broken roots sticking up in the air.

An excellent illustration of the type of growth trees may make when lying on the ground can be seen in one of the orchards of the Graves Brothers of Syria, Va. Several years ago a few young trees in one of their plantings were blown down. They were left in the horizontal position. Since that time the branches have turned upward and a satisfactory bearing surface has been developed.

### Care of Horizontal Trees

If apple trees are allowed to remain in a horizontal position,

Reprinted by permission from American Fruit Grower, Willoughby, Ohio, December 1954

the branches which are next to the ground must be removed. The remaining branches will need to be thinned out to reduce the amount of small, poorly colored fruit in the center of the tree. The lowest branches on the trunk should be encouraged to develop in an erect position and produce laterals which extend back over the root.

If the ground was loosened when the trees were blown over, an attempt should be made to close up any air spaces which may exist around the roots. If the soil is of a light sandy texture, it may be jarred and tamped back in place. If the ground is heavy it will be necessary to use water to puddle the soil back around the roots. The use of liberal amounts of water is very important.

**Bracing Salvaged Trees**

In some cases it may seem desirable to pull the trees into a vertical position. Care should be exercised to avoid additional damage to the roots. If soil has accumulated under the trunk it should be removed before the tree is pulled up. The ground should be thoroughly wet so the roots can slide through the soil without additional breakage.

After the tree is erect it must be firmly braced to hold it in position. Guy wires in at least three directions are advisable. The stakes holding the guy wires seem to hold better if driven into the ground straight rather than at a slant. A No. 10 wire is a suitable size.

Several methods of fastening wires have been used. Some growers attach the wires directly to branches in the top of the tree and later remove the branch. In this way there is no need to be concerned about girdling, but more wire will be needed for the bracing operation. If the wire is placed around the trunk a protective loop of hose may be used to prevent girdling. This method of bracing is not as satisfactory as the ones described below.

The procedures suggested by W. H. Thies, extension horticulturist in Massachusetts, in a recent issue of **Fruit Notes** are worthy of consideration. Thies writes:

"The methods followed by two growers have been quite practical. In both cases the guy wire was inserted through a hole drilled in the trunk. Grower No. 1 used a galvanized and twisted type of wire, and stakes 24 inches long made by sawing diagonally a piece of fir 2x4, each piece making two stakes. A 3/8-inch hole was bored horizontally through the tree in line with the direction of pull. The ends of the wire of proper length were stapled to two stakes.

"The center portion of the wire was then doubled over, in-

serted through the hole and through a metal washer on the side farthest from the stakes, bent downward, and stapled about 8 inches below the hole. The washer was placed against the end of the hole to prevent the wires from cutting into the tree trunk. The stakes were then driven in with resulting tension on the wires. The angle between the wire and the horizontal was in no case more than 45°. Where more than two stakes were needed, one or two additional stakes were placed, with similarly attached wires, at selected points around the tree."

"Grower No. 2 used a somewhat heavier type of ordinary iron wire with the idea that it would hold up at least three years before rusting through and by that time the tree should be on the way to the re-establishment of its root system. A 5/8 inch hole was bored horizontally through the tree, but at right angles to the direction of pull. Two stakes were placed in such positions that they would provide support where most needed. The wire was then inserted through the hole and the two ends wrapped around the stakes. No staples were used. Where support in other directions was needed, an exact duplicate of this setup with two additional stakes and another piece of wire on the other side of the tree was provided, the one hole serving for both pieces of wire."

**Replace Damaged Roots**

Experience with trees blown down by previous hurricanes has demonstrated that there is very little new growth from the ends of roots which have been broken off. Therefore, some method of providing new roots should be followed.

The best method of supplying new roots is to plant young seedling trees around the base of the damaged tree and inarch them into the trunk about two feet above the ground. The inarching is done by a side graft technique using a long sloping cut on the top of the seedling tree and fitting this into a similar-sized opening in the bark of the trunk of the damaged tree. The beveled end at the top of the seedling should be firmly attached to the trunk with small nails and the entire wound covered with asphalt wound dressing or grafting wax.

The inarching operation involves considerable expense. It is difficult to pull the trees to a vertical position and hold them there. The guy wires are expensive to install and must be kept tight for several years. Mowing and other orchard operations are more difficult with guy wires extending out from the trees. All of these factors are reasons why the salvaging operation may not be an economical procedure, particularly

with trees which are more than 20 years old.

**Pruning Salvaged Trees**

Regardless of whether the trees are left on the ground or are pulled erect, they must be given special care the following year. Pruning should be moderate because a large leaf surface is necessary to provide food materials to help the damaged roots become re-established. If excessive root damage has occurred it may be advisable to prune more heavily to reduce the need for water until the root system is re-established.

Fertilizer should be applied in early spring and within reach of injured roots.

Damaged trees need a liberal supply of water. If irrigation is not available, use of mulch around the trees is advisable to help conserve soil moisture. The fruit crop should be thinned heavily to reduce the demand for water and food materials.

Mice must be controlled. Damaged roots form callus tissue which is especially palatable to mice. If the ground is loose it should be firmed down. Particular attention should be given to mouse poisoning.

## Fertilizer Greatly Reduces Production Costs

Wheat production costs can be cut as much as 38 cents a bushel by improving farming practices, including the use of fertilizer. Corn production costs can be lowered by 19 cents a bushel and oats by 21 cents.

That's the report from recent studies by the U. S. Department of Agriculture and the Michigan Experiment Station. The studies revealed also that production costs on alfalfa-brome grass hay can be reduced $3.50 per ton by these better practices; and sugar beets by $3.02 per ton.

The Michigan tests showed that under average farming methods, it cost $1.65 to grow a bushel of wheat, as compared with $1.28 when better soil management and more fertilizer are used. Corn cost $1.21 per bushel under average methods and $1.02 with improved practices; oats, 90 cents and 69 cents per bushel respectively. The corresponding figures on alfalfa-brome hay were $16.80 and $13.30 per ton; and on sugar beets, $11.21 and $8.19.

By reducing production costs per bushel, the farmer automatically increases his profit. The Michigan studies indicated that farmers as a rule are not using enough fertilizer for maximum profit on their crops.

*Nebraska Extension*

# Eight Tons of Hay Per Acre

**How a Nebraska farmer baled 8 tons of hay per acre from an irrigated field. . .**

Condensed from Nebraska Farmer

*Homer Fine*

WHEN it comes to producing top-quality hay and lots of it, Harold Ballentine takes a back seat to no one.

Harold, who farms southwest of Brule in Keith County, Nebraska, baled over eight tons of hay per acre from four cuttings on a 20-acre irrigated field last year.

What's his secret? No secret. He plants an improved mixture made up of Intermediate wheatgrass, bromegrass, alta fescue, orchardgrass, alfalfa and ladino clover. He adds nitrogen and phosphorus. Then he turns on the irrigation water.

The grasses and legumes were planted in August of 1951. Although Harold did not fertilize the field at that time, he put on 150 pounds of nitrogen per acre the following year in two shots of 75 pounds per acre each in February and mid-May. Then he added 150 pounds of 42 per cent superphosphate the following year.

Another 20-acre field was planted a year earlier to the same grass mixture, giving hm 40 acres of border-irrigated pasture and hayland.

Harold figures the secret of getting plenty of hay and pasture after the right conditions are set up is in the application of enough irrigation water. "You've got to water it," he says, "And we use plenty."

He irrigates every 12 to 15 days, and figures on keeping the hayland wet most of the time. Since his pump is rated to produce some 1165 gallons per minute, there is always water available when the improved grass gets thirsty.

By way of comparison, Harold's eight-ton yield of mixed hay made more than twice the tonnage per acre of Nebraska's irrigated alfalfa. According to the State-Federal Bureau of Ag-

Reprinted by permission from Nebraska Farmer, Lincoln, Nebraska, December 4, 1954

ricultural Statistics, the state average yield of irrigated alfalfa in 1954 was about three and a half tons per acre.

Harold runs about 250 head of Angus cows on the 160-acre farm and outside summer pasture. His nine bulls are registered and every individual in his herd is from registered stock.

In addition to the mountain of hay and the grain he raises in Keith County, Harold also has 110 tons of corn silage in his trench silo. The 110 tons of silage came from eight acres of corn.

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## Incentive Payments For Wool

"To be eligible for the new wool incentive payments the wool must have been sheared after January 1, 1955, and marketed beginning April 1, 1955," says Ben Morgan, Extension animal husbandman at West Virginia University.

He explains that those wool producers who shear between January 1 and April 1, 1955, who want the wool to be eligible for the wool payments provided under the National Wool Act of 1954, must retain ownership of the wool until after April 1. Wool sheared during the January-March period may be stored in a commercial wool warehouse or consigned for future sale but the owner must retain title during the period if the wool is to be eligible.

Under the National Wool Act of 1954, the Secretary of Agriculture has announced an incentive price of 62 cents per pound for shorn wool, grease basis, for the 1955 marketing year. If the national average price received by all producers of wool falls below the incentive price, payments will be made to producers.

According to Morgan, payments made to producers will be based on the percentage needed to bring the national average price received by producers up to the incentive level, and that percentage will be used in calculating the payment to be received by each grower for his wool. For example, if the incentive price is 20 per cent above the national average price each producer's incentive payment would amount to per cent of the net sales proceeds he secured for his wool.

"The method of determining any payment made means that each producer should sell his wool for the best possible price because his incentive payment will be a percentage of the net amount he obtains in selling his wool," Morgan says.

# BULK MILK COLLECTION ADVANTAGES

**Great advances are being made on dairy farms. . .**

Condensed from Guernsey Breeder's Journal

*Dr. W. H. Haskell*

CONSIDERING all the latest developments advanced for improvement in milk production and handling, the bulk collection of milk from dairy farms has probably advanced with the greatest rapidity.

Bulk milk handling may be applied to hand-milking, machine-milking and the more modern method of pipe-line production installations.

When farm milk vats—frequently referred to as tanks—are coupled with properly installed pipe-line systems, a closed system of milk handling is provided which practically eliminates contamination of the milk from outside sources.

Many experienced men, after close observation of bulk milk collections and investigation into the advantages of such a system, have stated that complete conversion to bulk milk handling in many markets will take place within the next few years.

Among the reasons for the increasing acceptance of bulk milk collection by milk producers may be included:

a. Easing of the drudgery of old style milk handling methods.
b. Reduction in man-hours of labor.
c. More satisfactory butterfat tests.
d. Milkhouse becomes point of sale.
e. Premium payments due to improved quality.
f. Reduction in hauling costs.
g. Possibility of reasonable period of financing by receiving companies.
h. Providing of facilities for protected milk storage during periods of storms, strikes, and other emergencies.

In the installation of bulk milk tanks every individual dairyman should concern himself with several important ne-

Reprinted by permission from Guernsey Breeders' Journal, Petersboro, N. H., Oct. 1, 1954

cessities:

1. A tank, of larger volume than may be immediately necessary, should be purchased. This allows for expansion in volume, provides storage facilities should every other day collection be inaugurated, and prevents financial loss due to necessity for purchase.

2. Tank should be properly placed in milkhouse to provide accessibility for cleaning, convenience for loading and efficiency of operation.

Rigid floor supports should be provided to insure against sinking of the base. Properly constructed tanks will not expand, but this should be guaranteed by manufacturers.

Each tank should be properly gauged to insure the accuracy of the volume measuring device, an extremely important factor in the dairy economy.

### Cooling Facilities

One of the outstanding advantages of a farm milk tank installation is the ability to cool milk and keep it cold. Cooling, in some milking systems, is done entirely within the tank. Tanks are provided with cooling facilities inside the tank wall and an agitator in the vat keeps milk circulating in contact with the cold wall. In other, perhaps more efficient systems, the milk is cooled as produced in cooling systems of various types, and then piped into the milk tank where it is in constant contact with the cold wall by agitation.

Two things, inherent in all milk production, should be borne in mind: (1) milk should have contact only with clean equipment; this keeps the initial bacterial population to a desirable minimum; and (2) to prevent the multiplication of any micro-organisms, to an appreciable extent, milk should be kept under 40°F.

Methods of cooling milk, employed under usual dairy methods, do not always lower milk temperatures sufficiently to satisfactorily retard the multiplication of bacteria.

It should be kept continually in mind that refrigeration, at low temperatures, should never be depended upon to cover up ineffectual cleaning and sanitizing. Some species of bacteria will increase in number at relatively low temperatures and among these are types which are capable of establishing product damage, such as undesirable flavors and odors.

Another, yet nevertheless important factor of safety, from both a quality and a public health point of view, provided by farm milk tanks, is that of protected storage. The tight fitting covers, capped ports, etc., of the milk tank prevents contamination of the contents by flies, dust, droplets from sneezes and coughs, and practically

eliminates hand contamination because there is no occasion for hand contact. Rodents and insects cannot gain access to the milk contact surfaces. These factors also have considerable bearing upon quality.

### Sanitary Upkeep

The sanitary "upkeep" of dairy farm bulk holding tanks does not involve any difficult or unusual techniques. Two sanitizing principles should be considered. (1) Cleaning is performed to remove visible soil from the equipment; and (2) sanitizers are applied to inactivate bacteria remaining on equipment after cleaning. This may be called invisible soil.

Suppose that the cleaning removes 95 per cent of the bacteria from the equipment. This leaves five per cent, which, if not effectively inactivated by the chemical sanitizing, may constitute an ample number to prove a definite detriment to milk quality.

In cleaning and sanitizing there are no substitutes for efficiency. Each step, outlined below, has a well established place in the preparation of the equipment for the important function of holding milk. Half-way methods of cleaning and sanitizing always lead to quality difficulties.

The cleaning and sanitizing of farm bulk holding tanks involves only a manually applied process, using only mild, hand cleaning methods. It may be outlined as follows:

1. Immediately after the tank is emptied, turn off the compressor (following the manufacturer's instructions) and flush the tank thoroughly with lukewarm water. The pick-up milk truck driver should perform this flushing operation.
2. Prepare washing solution in a rubber pail, using one ounce of balanced alkaline detergent (powder) to each three gallons of water, 125°F. Hand brush the entire tank, using either a hand brush or long-handled brush, depending on ability to reach all the surfaces. Every three or four days, in place of the alkaline detergent, use a balanced organic acid detergent (liquid), one once to three gallons of water, 125°F. The alternate use of the alkaline and organic acid detergent removes and prevents the formation of mineral deposits on equipment surfaces.
3. Dispense cleaning solution to drain and rinse tank thoroughly with hot water, not over 145°F., to remove all washing solution.
4. Close lids on tank and allow to drain dry.

5. **Just before use,** sanitize with liquid sodium hypochlorite solution, 200 parts per million. This chlorine sanitizing solution may be applied by:
   a. Spraying all inner surfaces of tank with fine spray of chlorine solution.
   b. Applying chlorine solution with suitable brush, used for no other purpose.
   c. Fogging chlorine solution into closed tank with suitable fogging equipment. Applicable mostly to tanks of 500 gallons capacity, or more.

As a word of caution, direct expansion type holding tanks should not be washed with solutions, or rinsed with water at over 120°F.

**Milk Tank Trucks**

Milk haulers frequently report the following advantages of bulk milk collection:

a. Pick-up can be handled by men of slighter build, and greater age, than is the case with can hauling.
b. Competent men can be secured for the job because work is cleaner and position more responsible.
c. Larger pay loads are possible.
d. Spillage of milk is eliminated.
e. Freezing of milk is prevented.

Many manufacturers are providing excellently constructed milk tank trucks, equipped with suitable pump, hose, refrigeration for samples, etc., which furnish efficient facilities for handling milk in bulk.

## New Discovery To Aid Corn Breeding

Corn breeding should be greatly expedited by the discovery that about one embryo in a thousand will develop without benefit of pollen, and will thus be a natural inbred, reproducing exactly the characters of its parent plant, more so than an inbred after the usual seven seasons of inbreeding. A selected corn is used as the seed-bearing parent and a variety with red stalk color dominant as the pollen parent. The progeny from this cross will be red-stalked, with an occasional natural inbred green-stalked. Using this technique, S. S. Chase of the DeKalb organization says they should be able to produce 1,000 new inbreds a year, drawing on about 50 open-pollinated varieties formerly grown in this country, with additional varieties being gathered from Central America and other foreign countries.

*Crops & Soils*

# 2, 4-D DOUBLES HIS PASTURE

**When Tough, Bad-tasting Weeds start crowding out grass in your pasture, try spraying. It beat mowing in these tests . . . . .**

Condensed from Farm Journal
*Ovid Bay*

YOU can kill a lot of perennial weeds in grass pastures, if you use 2,4-D.

And, spraying *will pay double over mowing, in extra grazing.*

That's the latest word from USDA tests on Arthur Hornung's 64-acre native-grass pasture in Lancaster County, Nebr.

"One thing in favor of 2,4-D is that the timing is less important than with mowing," explains M. K. McCarty, USDA weed specialist.

Mowing won't cut down the number of perennial weeds much, reports Dayton L. Klingman, USDA research worker who originally set up the test. "Timed right, mowing does help hold down annuals, like ragweed," he says.

Costs run about $1.50 per acre for mowing, $2.50 for spraying—$1.00 for chemical, $1.50 to run the sprayer.

But the Hornung tests show that a single spray controls many more kind of weeds than one mowing.

*Hornung got* 76% *kill* of tough ironweed when he sprayed it in July over three seasons with one pound of 2,4-D ester per acre. A June spraying got 93%, and when the pasture was plowed, re-seeded to bromegrass and then sprayed, 99% of the ironweed was killed. An August spraying gave only 33% control.

Scientists have been working with Hornung since 1951 to get these results. They divided his pasture and are testing three kinds of management along with mowing, spraying, and re-seeding. One area is grazed as usual, another is deferred and rotationally grazed, and a third is ungrazed.

*Here's the way* different treatments affected the amount of forage when cattle were just turned out on the pasture (pounds of dry matter per acre):

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| | *Pounds* |
|---|---|
| Check plot | 1,300 |
| Mowed | 1,500 |
| Sprayed, 2,4-D | 2,000 |
| Re-seeded and sprayed with 2,4-D | 3,100 |

Actually, the difference in yield in favor of spraying is more than these figures indicate. *As weeds die, pasture grasses increase.*

For example, a three-year average of "grazed as usual" and "deferred and rotationally grazed" areas produced as follows:

| Check area | *Pounds* |
|---|---|
| Desirable grasses | 1,203 |
| Broad-leaved weeds | 2,310 |
| Mowed in July | |
| Desirable grasses | 1,150 |
| 2,4-D in July | |
| Desirable grasses | 1,893 |
| Plowed, re-seeded and sprayed | |
| Desirable grasses | 2,385 |

So, with only the treatments to make a difference, and an electric fence to control grazing, Hornung's cattle got nearly twice as much "desirable grasses" from 2,4-D sprayed areas as from either the check plot or mowed areas.

"It's the 'desirable grasses' and not weeds that put gain on cattle, and I'm 100% on 2,4-D over mowing to get the weeds out of a pasture," says Hornung. "Mowing just won't do the job, especially on those tough perennials. *It's better than nothing, though.*"

*Unless you have* as many weeds as Hornung, you may not get the big jump in extra grazing that he did. But the scientists think that their comparisons between mowing and spraying would apply in most of the country.

And with the right rainfall spacing, and adapted grasses, your increases in grazing should compare with Hornung's, if your weed problem is serious, says Marion Parker, head of the USDA's Weed Investigations Section at Beltsville, Md.

Of course, you'll want to keep the 2,4-D spray away from legumes and other crops such as soybeans or cotton.

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**Manure Helps Game Birds**—Like to cut down on the weeds in your corn next year, and feed pheasants and Hungarian partridge on your farm at the same time?

Spreading manure daily is a good way to do it, says J. J. Hickey, wildlife specialist at the University of Wisconsin. Game birds pick out the undigested weed seeds which would otherwise compete with your corn this spring. Quail may be a little hesitant, Hickey says, but even they will come out if you spread manure near a fence or hedge row.

# Is Yours a Father and Son Business?

**It is well to make careful plans to protect all interests. . .**

Condensed from American Poultry Journal

*G. T. Klein,* University of Massachusetts

THERE'S more to having a son become a partner in a poultry business than meets the eye. There are inheritance laws to think about, methods of protecting the partners through insurance, workman's compensation laws, accident insurance. There are salary scales to think about, ways of dividing profits, if any, at the end of the year, division of responsibility and many other problems.

In Massachusetts, there are a number of poultry breeding farms in which father and son operations are involved. Some of these men have spoken out frankly on methods they have used to set up corporations, divide the work, responsibilities and profits.

One of the oldest breeding farms is Parmenter Reds, Inc. Started over 40 years ago and pedigreed since 1915, three generations have had a part in this business which is known worldwide. Incorporated in 1947 with three members of the firm as signers, E. B. Parmenter, the senior member is president; Ray Parmenter is assistant treasurer and clerk.

A corporation is appraised as having some advantages for a large business. It protects the officers or owners to some extent from liability or suits in the case of accidents or unusual circumstances connected with the business. Parmenters carry life insurance on each to protect the other in case of untimely death. A corporation could have advantages in income tax payments. Again, there could be none.

In writing on the arrangement, E. B. Parmenter states that in his will, "an agreement or trust is made with my wishes

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for future disposition of my investments and business in respect to more than one generation which may or may not work out." Because this business is so very old, he wishes to see it perpetuated, the reason for looking so far ahead.

The salary arrangement is that the two partners draw weekly from the business and at the end of the year, divide the profits.

This is a very large business, covering 4 farms, hatching 1½ million chicks a year and maintaining a breeding herd of 100 Hereford cattle; 30 people are employed. In dividing the work, E. B. handles most of the correspondence and supervises the farm work. Ray supervises the pedigree work, the egg setting, the 100 acre farm where 25,000 R.O.P. chicks are raised. He studies interior egg quality.

The Herefords were added because there was much valuable pasture and hay land going to waste and tons of poultry manure. They make it possible to do more range rotating and to do a better job of farming.

E. B. Parmenter says they are very busy and need others to take over part of the responsibility. In spite of it, there are a few weeks for a winter Florida vacation and a bit of time at the seashore.

The future of the poultry breeding business looks right because there are so few going into it and doing the enormous amount of pedigree breeding work. The breeder can get by financially only because he is pretty sure of a demand for his cheaper priced chicks on a large scale. There is plenty of work ahead to do and plenty of incentive to work.

### Other Examples of Father and Son Businesses

There is a White Plymouth Rock pedigree breeding business at Foxboro, Mass., which has been in operation for over 25 years. Partners are Albert C. Lawton, his sons, Norman F. and Roger M., and son-in-law, Richard P. Webber. In addition to pedigree work with poultry, they have a sizable feed business, being agents for an eastern concern. In general, Norman has charge of the breeding work, Roger, the feed business, but all give a hand where it is needed. Albert stands by to see as best he can that operations run smoothly. He is paving the way to turn it over to the boys.

The firm carries hospital insurance, employer's liability and a policy which will give the partners capital to go it alone, should that decision some day be reached.

While Lawtons see this as a day favorable to the big breeder, they think there is a place for the small family operation. They can give close supervision

to the program.

Clifford W. Avery, owner of Fort Morrison Farms, Colrain, Mass., is quite familiar with partnerships in the poultry business. In 1925, Cliff was made a partner in the farm operations by his father. Today, he is marking time until his son, Ken, fulfills his military obligations to Uncle Sam and can be sure of permanent residence on the farm. He has delayed making Ken a partner because, as his lawyer advised, they are easier made than broken.

But Ken is in reality a partner. Since graduating from the Poultry Department at the Univ. of Massachusetts two years ago, he has been responsible for feed buying, feeding and brooding and rearing of the chicks. Ken has remodeled the hotwater brooding system, put in mechanical feeders, and planned the entire operations for bulk feed delivery. He can run the entire business when Cliff and Mrs. Avery are at their summer home in Maine, until a partnership arrangement can be worked out.

Averys see a bright future for the breeding business, with ups and downs, but generally a forward progress. More efficient ways of doing the poultry work, new disease control methods all offer a challenge to the new generation.

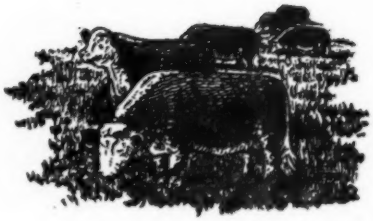
In Essex, Mass, is the business of Hardy Poultry Farms and Hatchery which became a father and son partnership in 1951. Founded by the father, C. Nelson Hardy, many years ago, it is one of Massachusetts' older farms. The son, Frank, a poultry graduate of the Univ. of Massachusetts, shares the work and profits as a full partner. Due to recent illness of the senior Hardy, Frank has carried on of late.

Workman's compensation, fire and accident and life insurance are carried on the life of Frank Hardy by the business. It is a chick business, moving about 350,000 a year. Growing almost yearly, the Hardys see no reason to worry about the future. They are approaching a "sold out" for 1955.

H u b b a r d Farms, Walpole, N. H., and Lancaster, Pa., is another example of a business which is integrated between a number of members of a family. In fact, there are now three generations of Hubbards connected with this very large business. A stock bonus plan is in effect for the owners and employees, in addition to salaries and wages.

As the several owners have indicated, working out a partnership arrangement is usually an individual problem. It should be gone into carefully, considering all sides. Insurance should practically always accompany it to give all parties protection.

# How to Make Sure Beef Cattle Will Gain Fast



**Production testing of beef cattle pays big dividends. . .**

Condensed from Successful Farming

*Dick Hanson*

PRODUCTION testing of beef cattle is growing.

The reason is clear. Cattlemen want, and need, to know which animals in their herds are giving them **the best return for each dollar spent for feed and breeding stock.**

Show-ring standards are of little if any value in determining cost and rate of gain. The gob-by-fat grand champion of the show ring is too costly to produce for a farmer interested in marketing inexpensive, fast-gaining animals. On top of this fact, consumers do not want grand-champion fat; they want meat.

The shortcomings of the show ring were recognized some years ago by forward-looking cattlemen. A new standard for judging the practical worth of an animal was needed—and production testing filled this need.

Production testing is simple. The only items you need are a set of livestock scales and a record book. Once you have these, all you do is keep records of birth weights, weaning weights, rates of gain, efficiencies of gain, live-animal grades, carcass quality, and dressing percentages. When you have these records, you can cull out slow-gaining, undesirable animals.

Keeping track of the items mentioned above may sound like quite a chore, but the farmers and ranchers following a production-testing program say the job takes very little time and the results are more than worth it.

You can get help in setting up a production-testing program on your farm. Your county agent, vocational-agriculture instructor, or state college will help.

Reprinted by permission from Successful Farming, Des Moines, Iowa, January 1955

Now, what about the results from production testing? Many colleges and experimental stations are doing production-testing work. Some of the latest work at Oklahoma A and M points out the basic values of production testing.

Researchers at Oklahoma found that beef cows differ greatly in their ability to produce heavy calves, and the weaning weight of a heifer's first calf is a good indication of her future performance. As a result of this finding, the first-calf weaning weight can be used as a basis for culling or keeping a heifer. Without production testing, poor-producing cows or bulls might be kept in a herd for years simply because they look good.

In 8 different experimental groups at Oklahoma tested over a 4-year period, the top cows weaned calves weighing 110 pounds more per year than the bottom cows in each lot. So, in 4 years, the top cows produced the equivalent of an extra 440-pound calf at no extra feed cost. The added value at 20 cents a pound would be $88. Also, the heavier, fatter calves presumably would be worth more per pound, further increasing the net return.

Production-testing programs are not limited to the producer of purebred stock, although purebred breeders were the first to begin using the program.

If you have a grade herd of beef cows, putting the herd on a production-testing program will help you weed out cows that are poor or irregular producers, shy breeders, and poor milkers. Records of performance will also show up bulls that do not settle cows promptly, as well as those that sire poor, slow-gaining calves.

The experience of Joe Hock, Plain City, Ohio, is a good example of how valuable production testing is to a farmer. Joe keeps about 45 Angus brood cows on his 355-acre farm.

Joe started keeping records in January, 1953, when he purchased a used set of barnyard platform scales. The scales cost $75, and another $150 was spent having them reconditioned.

This cattleman considers the expenditure for the scales one of the wisest investments he's ever made. For instance, he discovered that he'd been feeding out 4 steers at a cost of 34 cents a pound, so he sent them to market. The steers were high on the market that day but still brought only 27 cents a pound.

The most unusual discovery to date in Joe's herd concerns a certain cow of this line that has dropped a number of heifer calves with unusually good body conformation.

It seemed to Joe that since these heifers were so typey, they

probably were not his best-gaining stock.

At the time the weighing started, only a daughter and the old cow herself were left in the herd. Each of these had heifer calves, and weight records were kept.

Individual weighings were made on November 16, December 12, January 2, January 15, and January 31. Both the daughter and the granddaughter of the old cow **averaged a little over 2 pounds of gain per day for the 100 days on** feed. Weights on the daughter, the younger of the two calves, were 570, 630, 665, 695, and 720. Weights on the granddaughter were 610, 665, 705, 725, and 760. So you see, type is still a good **indication** of gaining ability. But because an animal is typey, it's no **guarantee** of gaining ability.

Joe no longer sells his heifers by guess. He knows what they have gained in his private test on them and prices them accordingly. Of course, body conformation and other standard means of pricing enter into the picture, too. But the day is past when this cattleman will let the best-gaining animals go for only a little more that the average. If buyers don't want to pay a premium for the good gainers—and many buyers do—they make ideal herd replacements.

O t h e r farmers are sold on production testing, too. Carl Tyner, Tipton, Indiana, said, "I wouldn't stay in business without keeping a close watch on my checking account. The same goes for production testing my beef herd. The records from production testing are similar to a checking account. You have a record of what you're putting into your herd, and probably more important, what you're getting out."

Details of a production-testing program for commercial cattlemen have been worked out by C. H. C o d d i n g and Sons, Foraker, Oklahoma. Selection of animals to go into their herd is based on **type** as well as birth **and** weaning weights. This year they plan to use artificial breeding. This will enable them to breed as many of their 540 brood cows as possible to two bulls that have outstanding records on progeny tests.

To get full benefit from production testing, start now and keep at it. Use the results. Cull out cows and bulls that don't measure up. You'll s o o n be realizing a profit from your efforts.

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**The rate of cattle bruising** appears to follow a sort of "social order" with the more desirable fat steers and heifers showing the least damage and cutter and canner cows the greatest bruise injury.

# Hay Drying Speeds Harvest

**Roundup of recent information on two and three level ducts for more air and better drying . . .**

Condensed from Better Farming Methods
*E. F. Oliver, W. J. Kjelgaard, J. A. McCurdy*
Pennsylvania State College

Increased emphasis on grassland farming has promoted a growing interest in the drying of hay by artificial means.

Many dairymen and livestock farmers look on the hay drier as a method of cutting waste. Not only is less hay lost in the field due to weather, but cattle clean up barn dried hay because it is more palatable. Increased production is realized by retaining the leaves and green color, thereby saving valuable protein and carotene. The use of the hay drier also permits starting the hay harvest two to three weeks sooner than usual. This insures harvesting at the proper stage of maturity instead of waiting for ideal curing weather.

Hay can be stored on a drier without danger of overheating; therefore, the possibility of spontaneous combustion is eliminated.

### Mow Affects Duct Size

The system designs in Pennsylvania have been greatly influenced by the bank type barn with high narrow mows. Generally, an open-central duct, conforming to the size and shape of the mow, has been used. This same duct design has been used successfully for chopped, baled, and long loose hay.

Even air distribution has been the limiting factor in this drying system. Due to most of the open duct area on the sides, getting air to pass through the top of the mow has been a problem. A duct four by six feet high has been commonly used along with a five hp. motor operating a 36-inch diameter propeller fan.

With this set-up the air is forced adequately out and up through about 14 feet of hay (which is eight feet above the duct). Even with this arrangement, much more air flows horizontally out the sides of the mow than vertically through the top of the mow.

### Don't Cover Sides

The sides of the duct should

Reprinted by permission from Better Farming Methods, Mount Morris, Illinois

not be covered to force more air out the top because the open air-hay contact area of the above duct is necessary to keep air speeds and pressures low to allow the air to pass easily through the hay. If the hay mows are larger or smaller than the above size, the duct and fan size must be changed accordingly.

Many farmers put more than 14 feet of hay in their hay mows but, of course, very little air penetrated this upper layer. To alleviate this situation vertical flues and barrels have been used to leave openings in the hay above the duct to within about four feet of the top of the hay. This helps the air distribution problem very much, but it requires god management for good results.

### Use Second Duct

A few farmers have used a second level duct with good air distribution results. This duct may have a separate fan or be fed air by a flue from the lower duct. Vertical flues, barrels, and second level ducts have all been a great aid to the air distribution problem.

Just prior to the haying season of 1954, an experimental hay mow 20 by 40 feet and 17 feet high was constructed.

Three air ducts were built. One two-by-two foot duct was placed on the mow floor, and two other larger ducts that were constructed in portable sections. When the hay being loaded into the mow reached the proper height, it was leveled by hand and the portable air duct placed lengthwise in the mow and then the fan was attached.

### Hay Dried Unevenly

First cutting chopped hay with an average moisture content of 35.5 per cent was blown into this mow to a height of 19 feet with the air ducts being located at floor level, and 12 feet above floor level. During the drying of the hay some heating and prolonged slow drying was found to exist at the corners of the mow but aside from these areas the curing was successful.

Although we were striving for equal air flow throughout the sides and top of the mow, the air flow measurements taken indicated that uniform air distribution throughout all areas could not be accomplished with the duct size and placement used during this test. However, we did find that the air flow throughout the upper layers of hay was considerably improved over the single duct at floor level system.

Many of the problems encountered during the mow loading and the placement of ducts were due to the difficulty of obtaining uniform level loading with a single blower location in-

troducing the hay over the side of the mow at the middle. It was necessary to hand fork the hay from time to time even though a man remained at the distribution pipe and moved it during loading. The problems of level loading became more acute as the hay height increased.

The unloading of several wagons of chopped second crop alfalfa onto the top of the mow after the first crop was cured introduced a drying problem that was impossible to overcome without frequent hand forking to open up new paths for air movement. The freshly harvested crop was acting as a barrier to air passage causing the air to seek the less difficult path downward through the already dry hay mass.

### Study Wagon Drying

Last summer's research work in hay drying included initial study of wagon drying which is becoming more popular. Heated air is being used to dry the hay quickly on three wagons which are housed in an all-metal building. Heat drying in the past has followed no definite pattern in the drying of hay. In wagon drying heat is essential so as not to tie-up the wagons over too long a period of time.

The heated air was blown through canvas under a false floor in the wagons.

## Swine Jowl Abscesses Cause Serious Losses

Cervical "jowl" abscesses of swine is a disease of growing concern to swine producers, veterinarians and meat processors.

A spot check by Livestock Conservation, Inc. with a number of packing plants throughout the country shows condemnation of heads to be running as high as seven per cent of the total hogs slaughtered in some midwest plants.

A typical case reported was a drove of 111 hogs from one hog belt farm in which 80 of the heads were condemned on post mortem because of abscesses. The losses of these 80 heads would approximate $120.00. In the same process much trimming is required in the neck area, adding to the cost of slaughtering.

According to Dr. J. R. Collier of Iowa State college who has conducted some of the leading research in swine jowl abscesses, eradication of the disease from problem herds is difficult. Such measures as depopulating the hogs, disinfecting of quarters and introduction of new breeding stock have not been too successful as reported by Dr. Collier.

*J. R. Pickard*

# What's the Pay-off in Conservation Farming

## Here's the answer in dollars and cents . . .

Condensed from Pennsylvania Farmer
*R. H. Blosser*

ONE OF THE FIRST questions asked by a farmer who considers adopting more soil conserving practices is this, "Will it pay me, and how much?" Usually this question is difficult to answer because profits from conservation farming depend upon a number of things. Some of the most important ones are soil type, the number and kind of conservation practices used, type of farming and efficiency of forage consuming animals.

Some answers were disclosed in a recent study made on southeastern Ohio dairy farms. Soils on these farms erode easily when cropped because many slopes range from 10 to 30 per cent.

Information was collected first on farms having soil depleting and conserving systems of farming. Since these two groups of farms differed in size and production efficiency, it was impossible to compare actual income figures and tell exactly how much conservation farming increased net income. Therefore, net income for both types of farming was calculated for a 120-acre dairy farm using crop yields obtained from the farms surveyed. Everything was kept the same except the amount of conservation practices applied. This method of figuring showed differences in income that could be attributed only to the additional crops produced under conservation farming.

### Conservation Profits

The graph shows conservation farming gave $490 more net income than soil depleting farming when no additional labor and capital were used. When all forage was fed to 5,000-pound dairy cows, conservation farming gave $300 more net income after hiring the additional labor needed. With 9,000-pound cows profits from conservation

Reprinted by permission from Pennsylvania Farmer, Pittsburgh, Penna.

farming increased to $765.

Crop yields for soil depleting farming were 46 bushels per acre for corn, 22 for wheat and 1.2 tons per acre for hay. Conservation farming gave 68 bushels per acre for corn, 26 for wheat, and 2.5 tons per acre for hay. Average prices were used for 1943-52 to give a true picture of price relationships

In this study soil depleting farming included red clover and timothy meadows, no contour strip cropping, inadequate applications of lime and fertilizer on the crop land and no permanent pasture improvement. Soil conserving farming included alfalfa-grass meadows, contour strip cropping and liberal applications of lime fertilizer on the crop land and permanent pasture.

Calculations were made for a one-man dairy farm of 120 acres because this type of farming prevailed in the area studied. Dairy cows provided a dependable market for forage and sufficient volume of business to use all available labor.

On many farms conservation farming requires more labor and capital than depleting farming if all the crops are harvested. However, some farmers may not be able to increase their labor supply. Calculations in this study showed that with no additional labor and capital conservation farming increased net income about $490 above soil depleting farming. Most of this increase came from raising more bushels of grain and feeding it to hogs.

### Heavier Investment

Further calculations showed that when all forage was fed to dairy cows conservation farming

**On A 120-Acre Dairy Farm**

| Conservation Farming If You Do This: | | Will Give The Following Increase In Net Income |
|---|---|---|
| Use Same Amount of Labor As Soil Depleting Farming and Turn Additional Forage Under | $$$$$ | $490 |
| Feed All Forage to 5,000-Pound Cows and Hire Additional Labor Needed | $$$ | $300 |
| Feed All Forage to 9,000-Pound Cows and Hire Additional Labor Needed | $$$$$$$ | $765 |

required about one-third more labor and one-fifth more capital than soil depleting farming. When this additional labor was hired and forage was fed to cows producing 5,000 pounds of milk for sale, net income from conservation farming was only $300 higher than depleting farming. This increase in net income was less than when no labor was hired and the additional forage plowed under. With this type of cow the farmer could not afford to hire labor to feed all forage produced under conservation farming. He would receive only 40c an hour for labor that cost 60c.

When all forage was fed to cows averaging 9,000 pounds of milk for sale, conservation farming increased net income about $765 after paying for the additional labor required. With this type of cow the farmer could afford to hire additional labor to use all of the forage produced under conservation farming. This level of milk production gave about 95c an hour for labor that cost only 60c.

These figures show the importance of livestock efficiency.

## Berry Acre Grosses $3,000

In a real demonstration of intensive farming, a Pender County North Carolina farmer, Bennie Herring, grossed more than $3,000 last year from an acre of strawberries. Herring sold more than 600 crates of berries from his acre of Albritton strawberries. None of the berries sold graded less than U. S. No. 1.

## Reed's Canary Grass

Jim Cooper of Marshall County, Iowa, has had splendid results grazing his fattening cattle upon Reed's canary grass. The cattle receive a full feed of corn and are pastured at the rate of five head per acre. He gets continuous grazing through a long season and has quite a growth left when freezes arrive.

Mr. Cooper's land is first bottom and subject to overflow. He does not remove the cattle from the pasture at such times as it floods and he reports that not infrequently they look like a bunch of water buffalo as they splash around in 12 to 15 inches of water, eating such parts of the grass as are above the water. Mr. Cooper has been able to get splendid gains on fattening cattle by following this system, and, needless to say, gets a very high return per acre for the pasture.

*North Western "Ag" Letter*

# How to Start Farming

**Survey of young farmers brings some interesting points to light and shows that goals are important . . .**

Condensed from The Farmer

*Omar Shonkwiler*

START farming now? Aren't costs too high, labor too short, prices too unsettled?

Don't believe it.

You can start farming today and make it go. You can beat high production costs, labor shortages, and unsettled prices. You can even start on a thin shoestring. The records of young men in Southern Minnesota and Eastern North Dakota who started farming in the last 10 years prove it.

University of Minnesota economists Truman R. Nodland and Henning Swanson surveyed 350 young farmers in Southern Minnesota who started farming in the last eight years. In an average of two and one-half years, they had made a net worth gain which averaged more than $5,000, double their original cash investment. More than half the beginning farmers started with a net worth of less than $3,000.

Some of these young men had help from veterans' subsistence payments, custom work, or family financial backing. But the goal of being in business for themselves was more important than their financial worth at the start. The ingredients of success were a determination to succeed, hard work, establishing a good credit rating, general farming know-how, investing in quick return enterprises, and finding cost-cutting shortcuts during the first few years.

In 1947 Wilbur Halbert, Nicollet County, Minnesota had $1,700, three cows, 22 chickens, experience as a farm worker and an urge to farm for himself. Today his net worth, mostly live-

Reprinted by permission from The Farmer, St. Paul, Minnesota

stock and machinery is about $30,000.

Mr. Halbert started as a 2/5-3/5 crop share renter without any machinery. The first crop year he gave half his share of crops for the use of a neighbor's machinery. The neighbor furnished seed and one-half the gas and oil. They traded labor hour for hour. Help for other operating expenses came from GI bill payments. That fall Mr. Halbert got an FHA loan for $2,500 to buy cows and machinery. As soon as he had his equity built high enough he converted to a bank loan.

He shopped around for cows, paid $146 to $210 per head, getting somebody else's culls. From the start he used artificial insemination and production tests and culled second-calf heifers that didn't produce 400 pounds of butterfat. His herd average today is 376 pounds for nine milking cows, and he no longer has any of the cows he originally purchased.

Cows and their 300-bird laying flock have been the Halberts' most profitable livestock enterprises. The farm is not equipped for hogs. They kept hogs for a while, getting a start by farrowing sows furnished by a neighbor, furnishing half the feed and getting half the income from market pigs. In 1950 they joined a farm management service, began keeping farm accounts and discovered they weren't making anything with hogs. "We just didn't have the housing," Mr. Halbert said, "Baby pig losses were too high."

A family that's interested in farming and willing to make some personal sacrifices is important when you're starting on a shoestring. Mr. Halbert had that kind of cooperation from his wife and three children. "We went without much entertainment the first few years," is the way he puts it.

Even where young men start with family assistance, corner-cutting and management know-how help speed success. James M. Reinhart, Nicollet County, went on the 160-acre family farm as a cash renter. His father took his note for livestock, machinery, feed. For operating expenses he did custom corn shelling, and some production credit.

To hold down costs, Mr. Reinhart and his brothers, Harold and Melvin bought machinery together, each paying one-third. This joint investment included silage cutter and blower, corn picker, elevators, threshing machine. They traded labor on these jobs to further reduce costs.

After three years on the family farm, James bought a 197-acre farm nearby with borrowed money.

Mr. Reinhart selects chickens and hogs, if equipment is adequate, for quick return investments. He keeps 600 layers every year. "Dairy cows are good if you can buy a milking herd, but take too long if you are trying to build up from young stock," he said.

Mr. Reinhart considers a definite repayment plan important to family assistance agreements. "The payment shouldn't be too high, of course, but it's too easy to coast if there is nothing pressing you," he said. He paid $1,000 plus interest yearly on his agreement.

Both Mr. Halbert and Mr. Reinhart emphasized the importance of getting and keeping a good credit rating. "You are lost without credit," Mr. Halbert said. To keep his rating intact he "paid when he could, went in and explained the circumstances when he couldn't."

Although the type of farming is different in Eastern North Dakota where farms are large and big machinery is necessary, Baldur H. Kristjanson, North Dakota Agricultural economist, sees the beginning farmer's problem there as being much the same as elsewhere. Credit of a kind and of an amount that will see the young man over the first barriers to farming for himself is the kernel of the problem. And here as elsewhere it is the fortunate young man who can make some practical partnership agreement with his father.

This type of beginning is being made by Dale Lohr with his father in Cass County, North Dakota. The plan is to make the 200-acre family farm produce enough to give Dale starting capital. To reach this goal, the Lohrs are intensifying the dairy operation. They own a bull, but are also using artificial insemination and culling the herd to increase production. They are producing Grade A milk and working toward building a herd of 40 cows. Dale's interest now is six of the farm's 36 Holsteins. He owns three of the 22 milking cows. To earn operating money, Dale bought a hay baler on shares with his father and does custom work. The Lohrs' situation gives some idea of the capital required for an economic unit of similar size. They value their land at $100 per acre and their stock and equipment at $20,000, a total of $40,000 for the 200-acre operation.

A percentage partnership is one way to start in a large scale cash grain area. This arrangement is being offered Marvin Curfman, Cass County, North Dakota, by Roy Bell. Mr. Curfman operates the two and one-half section Bell grain farm. Mr. Bell supplies machinery and equipment. Operating expenses

including fuel, machinery cost and repair are shared equally. Mr. Curfman gets one-fourth the gross income from crops, soil payments, and earth-moving done on a custom basis with track-type diesels used for farming. He also shares in return from a large round-roofed building rented out for machinery storage.

Mr. Curfman is putting some of his share into purebred Guernseys, now has five milking cows.

There are some general rules beginning farmers can follow to avoid pitfalls in today's high-cost farm situation. Most of 157 successful Southern Minnesota farmers surveyed by Dr. George Pond and Donald Moore, University of Minnesota agricultural economists, recommend starting as a renter.

Starting as a tenant requires an average of $9,400 working capital in Southern Minnesota. Soundest way to start is to own half that amount.

Low-capital beginners should start in a partnership, or with a 50-50 crop and livestock share lease. Avoid large investments in machinery and equipment. Good used machinery, hiring custom work and exchanging labor for machine work are ways suggested to keep machinery investment from getting top heavy at first.

Put your money where it comes back fast in quick return enterprises such as dairy cows, hogs, and chickens.

How about buying a farm now? You should have your personal property clear and be able to pay at least a third of the purchase price down, those who have studied the successes and failures of beginning farmers advise. Don't buy a run-down farm and try to build it up is another rule they give.

Whether buying or renting, get on a good productive farm large enough to make a good living. Of course, financial help from relatives, in the form of gifts, loans at rates and in amounts more favorable than commercial lending agencies can offer, and the loan of some machinery have gotten many young farmers over their first hurdles toward farming for themselves. But there are other factors as important as capital. They are know-how, interest in farming and liking rural life, courage, faith in the future, and a wife who is interested and shares responsibility in the farm's management.

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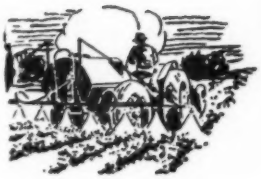
U.S. demand for farm products is strong and agricultural exports are up a little from a year ago but prices to farmers continue about three per cent below a year earlier.



# 1955 INSECTICIDE PROBLEMS

## A scientist discusses problems which face the farmer . . .

Condensed from Michigan Farmer

*Ray L. Jones,* Michigan State College

TO GET the best results from insecticides, we must continuously review and improve our information about them.

In this article we will not discuss all features of our insecticide problems, but give you selected information of value to your farming operations.

### Insecticide Residues

Recently the Pure Food and Drug Administration of the federal government set tolerances for a number of these insecticides on food crops. This means that any food crop having on it at harvest more than the allowable amount of insecticide can be withheld from market by federal law.

The tolerance for DDT is 7 parts per million on fruits and vegetables although there is no tolerance for DDT in milk. Seven parts per million is the same relationship as 7 pounds to 1,000,000 pounds. On apples this would permit one pound of actual DDT to 142,857 pounds of apples or one pound of DDT to 2,976 bushels based on 48 pounds to the bushel. The tolerance on other fruit and for vegetables could be figured the same way. Dieldrin, for instance, which may be used on apples for plum curculio has a tolerance of one-tenth part per million. This is one-seventieth that allowed for DDT. From this, you can see that such materials as dieldrin must be used even more carefully than DDT.

The use of insecticides as far as residues are concerned need not worry you. The main thing is to use them carefully and wisely so that they will not be present on crops at harvest. Labels on insecticide packages will give you information on how to use insecticides so as to avoid unallowable residues.

### Dusts and Wettable Powders

Some of the more interesting things regarding insecticides are the research findings on dusts,

Reprinted by permission from Michigan Farmer, Detroit, Michigan

emulsions and wettable powders. For a time, we have had some idea of what the facts were concerning these 3 forms of insecticides. However, it is only in the past year or two that we have made real progress on the problem. For instance, I have seen reports on recent work showing that DDT emulsions are superior to wettable powders for control of elm bark beetles. These beetles carry the spores of Dutch elm disease from infected to healthy trees. People living in areas where the disease is killing elm trees will be interested in this information.

For farmers controlling spittlebugs affecting alfalfa and clover, the following should be useful. The emulsions of methoxychlor are much more effective on spittle bugs than are the wettable powders of this same insecticide. On the other hand, either the emulsions or wettable powders of lindane, can be used for control of these insects. The only exception would be where weed sprayers are used to apply lindane. In this case, lindane emulsions are preferable to the wettable powders of this same material.

Please note: Lindane should not be applied closer than approximately 35 days before harvest of alfalfa and clover. This usually gives sufficient time for the residue of this material to disappear from these crops.

I would like to give you another example of the importance of insecticide emulsions for the control of insects. Corn earworm may be very annoying and damaging to sweet corn during some years. Although in years past, we have suggested DDT wettable powders, it is the DDT emulsions mixed with non-injurious summer oils that give the superior control. It was only after we obtained sufficient experimental data that we became sure of this important difference.

Our insect control suggestions of the future are going to tell you more about the right insecticide formulations to use. You, of course will need to keep up to date on this very important feature of insecticide use.

### Storing Insecticide Emulsions

It is important that insecticides stored over winter be checked carefully before using them. Occasionally insecticide emulsions are kept in places where temperatures may drop to freezing or below. This is harmful to many emulsions. Temperatures especially below freezing force the chemical out of its solvent and the material collects on the bottom of the container. If upon inspection of an emulsion, a cake of crystals is found on the bottom of the container, new insecticides should be purchased and used.

### Soil Insecticides

A soil insecticide is a chemical that is applied either to the soil surface, within the soil or to seeds for the control of insects living within the ground. These insects do their main damage

generally to the roots or planted seed.

During the past few years, we have seen a vast improvement in the insecticides for control of such soil insects as wireworms, strawberry root weevils, white grubs, and maggots. However, in spite of a considerable number of effective materials available for this purpose, there are still some weaknesses in the soil insect control program. For instance, we are limited in the ways we can successfully apply soil insecticides. In addition, one material may be suitable for use on one crop and not upon another. This latter problem alone requires considerable attention if soil-inhabiting insects are to be controlled satisfactorily and the crop kept at its highest quality.

For some time, we have been using lindane to treat corn seed for seed corn maggot. This treatment is possible because there is little danger of adversely affecting the corn plant with this material. On the other hand, it would be very unwise to use lindane for soil insecticides damaging potato tubers. The reason for this is that lindane can cause an undesirable taste to develop within the tubers. I draw your attention to these problems with the following thought in mind. The only way I know of to avoid trouble with soil insecticides on different crops is to use them strictly according to reliable directions. Please note: Lindane should not be used to treat the seed of corn intended for certification.

Generally chemicals mixed with the soil are more suitable for control of soil insects than those applied to the surface of the ground. The reason for this is that it is difficult to get chemicals to penetrate into the soil when they are applied to the surface and especially when there is no chance of working them into the soil. As far as is possible, all soil insecticides should be applied, then worked into the soil before the crop is planted. You will find that doing it after the crop has been planted will not always give good results.

Seed treatments in the main, do not involve the problems encountered when using soil treatments. The seed is treated and then planted. This does not involve additional working of the soil. However, we must keep in mind that some seed treatments are not as valuable as are insecticide applications mixed with the soil.

## Applying with Weed Sprayers

Many of our weed sprayers are not designed to control certain types of insects. This may be primarily because they do not develop sufficient pressure to put insecticides where they wil come in contact with insects. Those weed sprayers having a top pressure of 40 pounds or thereabouts, do not generally prove satisfactory where penetration of heavy foliage is necessary. Last summer we found it difficult to get control of army-

worms in rank-growing grains primarily for lack of sufficient pressure. Any change in the nozzle openings or increase in pressure that will improve penetration will be to your advantage when using weed sprayers for control of insects.

The right insecticide formulation is important when using weed sprayers. Emulsions (liquid insecticides that turn milky when added to water) are more suited for use in weed sprayers than wettable powders. This when mixed with water pass readily through the small nozzle openings of these sprayers. The large particles of wettable powders tend to clog the nozzles and damage the pumps of weed sprayers.

### Malathion

Malathion is a phosphate type insecticide just as is parathion and TEPP. We have pointed out repeatedly that TEEP and parathion are especially dangerous materials to handle when we take them from packages and when we are applying them to trees and other crops. As I traveled over the state this past summer, it was very evident that many farmers believed malathion to be as dangerous to use as parathion and TEPP. However, I am happy to say that this is not the case. Malathion is in most respects no more dangerous to use than is DDT. This means that you can use malathion more freely than either parathion or TEPP. However, as in the case with all insecticides, the safest thing to do is read the label on the use of malathion and follow the directions accordingly.

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## Water More Important Than Land? ? ?

Dean A. M. Eberle of the South Dakota A. & M. College comments ". . . I rate water as a natural resource, more important than land. Technology will continue to increase food production and rehabilitate land but there is no indication that we will be able to increase water."

There is a lot of room for thought in connection with this statement. It sounds fantastic, but the more one thinks it over the more one is bound to realize that Mr. Eberle is right. When General Pick retired from the Army two years ago, the theme of his swan song was built around the theory that in 100 years water would be the number one problem confronting the United States—and possibly long before that time.

# FEED YOUR BROOD SOWS WELL

**To get big, husky litters, good feeding and management are necessary. . .**

Condensed from American Hampshire Herdsman

THE brood sow is a pig factory. Her job is to produce from the feeds she is fed a big husky, litter of uniform pigs with a minimum of runts or weak pigs. Like any factory or machine she must be provided with the essential ingredients for the development of a big litter of pigs. This means an ample supply of protein, minerals and vitamins and enough energy foods to insure desired increase in weight and maintain good vigor and activity. The protein, mineral and vitamin requirements of the bred sow are fairly constant but the energy or carbohydrate needs may vary considerably, depending upon the season and the condition of the sow.

Good feeding of the bred sow should start before she is bred. About two-thirds of the growth made by the unborn pig takes place during the last four weeks of gestation, but the size, strength at birth and the livability of the pigs depend upon proper feeding of the sow prior to and thruout the gestation period. The early part of the gestation period is a critical time. Many egg cells are fertilized and start to develop that never appear as new born pigs. Proper feeding at this time greatly effects the number of these fertilized eggs that live and develop.

Green pasture seems to supply a factor that is needed for reproduction and lactation and that has considerable carry-over effect. This factor also appears to be stored for some time and definitely influences a sow or gilt's ability to conceive, reproduce and give milk months later. Green pasture is also a cheap source of feed. For these reasons one of the first sound steps in the brood sow feeding program

Reprinted by permission from American Hampshire Herdsman, Peoria, Illinois, December 1954

is to provide good, green pasture as near the year around as possible. Gilts going into the breeding herd should be selected 60 days ahead of the breeding season and given access to good green pasture.

The best substitute for green pasture is dehydrated alfalfa meal. It should be green in color and have at least 17 percent protein. Use it to make up about 15 percent of the total brood sow ration under dry lot conditions. Good, green, leafy legume hay may be fed, but some sows will not eat enough and many problems are often confronted in efficient feeding of loose hay with a minimum of labor. Bright, leafy, alfalfa hay may be ground and substituted for alfalfa meal but again the vitamin and protein content of such hay may vary considerably and not give the results desired.

Gilts should be fed to gain about one pound per day during gestation. A sow should gain about three-fourths of a pound per day as a rule although this will depend upon her condition. In general gilts should get about 1¼ pounds of total feed daily for each 100 pounds of live weight while sows should get about 1 pound of total feed for each 100 of live weight.

The gilt ration should contain about 15 percent protein and that of the mature sow slightly less. Many good commercial supplements are available which can be combined with the farm grown grain available. A good rule in feeding them is to follow the recommendations of the manufacturer. Good supplement mixtures may be obtained from the agricultural college in your state. In general it is good practice to feed enough supplement to be sure of providing adequate protein and vitamins, self feed a good mineral mixture, and then feed grain in accordance with the condition of the sows and gilts in the herd.

Self feeding saves labor but usually requires more feed. Plenty of bulk should be included in the ration to be self fed to prevent the sows and gilts from getting too fat. It is usually best to feed gilts separately from the sows. Old sows often fight the gilts away from the feeders and troughs and if the ration is such as to keep the sows from getting too fat the gilts may not gain enough. Bulk may be added to the self fed ration by the addition of such bulky feeds as ground oats and dehydrated alfalfa meal. Feeding should be done so as to aid in forcing the sows and gilts to take ample exercise. Plenty of fresh water should be available at all times and since cold weather adds its problems, steps should be taken to see that freezing will not limit the water supply.

# They Bored Their Soil Into Higher Profits

**New soil testing laboratory brings great benefits to vegetable farmers in this community . . .**

Condensed from New Jersey Farm and Garden

*W. S. Meseroll, Jr.*

"WE spent $5.50 . . . grossed an extra $3,475."—Howard Walker and Son, of Porchtown, New Jersey.

"Spent $30.50 . . . cut our fertilizer bill by one-third."—John Placenda and Sons, Newfield, N.J.

"We moved sweets this year (300 bushels per acre, average yield) when others couldn't."—Capozzi Brothers, Newfield.

"Saved an orchard,"—Jonathan Sahms, Glassboro, N.J.

"Our apple crop was more than three times as heavy this year as in 1953. Had one of the best crops we have ever grown on the farm."—L'Opera Farm, Sewell, N.J.

"Saved half a ton of fertilizer per acre on alfalfa—guesswork in fertilizing is eliminated."—Alvin String, Harrisonville, N.J.

How is that for a line-up of testimonials?

These farmers are praising the Gloucester County Soil Testing Service set up in Glassboro, N.J. two years ago as a joint project of the Gloucester County Board of Agriculture and the soils department at Rutgers University.

The laboratory is a one-man operation—Roy Flannery, extension associate in soils. A native of Kentucky, Roy, with his test tubes and soil auger, has become a friend of 279 farmers, many of whom claim that his work has increased their incomes anywhere from $500 to $5,000.

Here's how the service works:

Reprinted by permission from New Jersey Farm and Garden, Sea Isle City, New Jersey, December 1954

You can take your own soil samples or Roy will do it for you. These are taken to the lab and analyzed. Within a week (48 hours if it is an emergency) Roy revisits your farm and delivers the results and makes recommendations. Fees are deducted from a $20 deposit made when you enroll. When that is used up, you are billed for each additional test. Plant tissue tests are made during the growing season.

Flannery has done some testing for non-members, but the fee per sample is higher. "We'll need about 325 members to operate at present charges," he says.

For many this service has meant reducing fertilizer costs over half; for others, more fertilizer and turning what would have been a poor crop and a loss into a good crop with a profit. For example:

"We wouldn't have had a crop in one two-acre field of eggplants if it hadn't been for the soil service," says Howard Walker, who with his son, Everett, farms 100 acres at Newfield. "The crop was on its way out when Roy tested and found the cause—a magnesium deficiency. Leaves had yellowed and the plants had stopped bearing. But four days after following Roy's recommendations, we started to see a difference. We averaged 927 bushels to the acre—397 bushels an acre more than in 1953."

Quality was better, too, the Walkers found. Average price they received this year was $1.41 a bushel compared to 83 cents last year. That gave the Walkers a gross income of $1,307.07 compared to $439.90 in 1953—or an increased income per acre of $867.

The story was the same for peppers. Actually, the Walkers thought Roy was "off base" when he recommended that they apply 200 pounds of nitrate of soda per acre on a three-acre field of peppers. "We even left two rows untreated so we would be able to show Roy he was wrong," says Everett. "The difference between those rows and the rest of the field was like night and day. Compared to the control, peppers in the treated field were greener, bigger, and we had twice the yield. We got 65 cents a bushel on the last picking when other farmers were getting only 50 cents."

Here are the Walkers' figures for peppers: In 1953, before they enrolled in the soil-testing service, yield was 642 bushels per acre; this year, 1,206 bushels —564 more bushels per acre. Average price received per bushel in 1953 was $1.35; only $1.20 in 1954, yet the Walkers' gross income per acre this year was $1,447 compared to $866 in 1953—a difference of $580. That

gave the Walkers an increased income from a three-acre field of $1,740. And the growing season this year was not as good as last year.

The Walkers feel they are just beginning to reap the benefits of the soil service. "We expect greater things next year, especially where using irrigation. You could irrigate day and night, and not get any results if you didn't know when and what fertilizer to apply. Next year we'll have all our irrigated soils tested during the growing season, as well as having all our fields tested before the growing season," says Howard Walker.

John Placenda and Sons, New-Field, figure they shaved their fertilizer bill by about $28 an acre—$182 for 6½ acres on lettuce alone. And that doesn't take into consideration better quality or increased yields.

"We used to apply at least a ton of fertilizer per acre. This year, only 1,000 pounds per acre on Roy's recommendation. We had one of the best lettuce crops we've ever grown. We should point out, however, that growing conditions this year were perfect."

"We used to apply 1,600 to 2,000 pounds of fertilizer an acre a season on pepper fields," says Dominic. "This year, we sidedressed with 300 pounds to the acre, then applied 200 pounds of nitrate of soda later. We actually cut our fertilizer bill on peppers about $40 an acre. Too, we used to lime our fields at least every third year, but found we didn't need it this year."

Roy Flannery is quick to point out that all cooperators did not reduce their fertilizer bills. For example: His observations indicate that in Gloucester County, 22% of the samples taken were low in magnesium, 24% were low in phosphorus, 45% in potassium. This means that these fields needed more than a normal application of fertilizer.

About 33% of the samples tested indicated that soils needed lime applications. Phosphorus tested very low in samples from newly cleared fields and from fields lying idle for several years, but was relatively high in topsoil from most other fields.

Phosphorus was low in many subsoil samples from fields testing very high at the surface, indicating a need for deeper placement of phosphorus, particularly for some of the deeprooted crops.

Asparagus plantings provided a good example. "We tested 50 fields this year, and found that 80% of them had low phosphorus content in the subsoil," says Roy. "Tests showed an average of less than 10 pounds of phosphorus per acre."

Deep placement of fertilizer

can become especially important in dry soils, according to Roy. "Place the 'super' and lime deep and roots will reach down into the soil further, increasing the available moisture zone," says Roy. "In other words, you can often double the amount of water the plant can get by placing the 'super' 12 to 16 inches deep. In a drought, the top six inches of soil may be dry. But go down 12 to 16 inches and you'll find moisture available.

"Some fields have been over-fertilized or limed, thus plenty of plant food was available this year," Flannery also points out.

To illustrate what he means, Roy took us to the Capozzi Brothers' farm at Newfield. The brothers used to spread 40 tons of limestone on 60 acres one year, on another 60 acres the next, and another 60 the third year. A soil test showed that in the 60 acres due for lime this year, pH was high enough in most fields. As a result, they only applied about 10 tons of limestone. When the pH starts down again, they may go back to a heavier application. With limestone costing about $8 a ton, the Capozzis saved about $240. The soil test service cost them only $30.

"We used to fertilize sweets with about one ton of fertilizer an acre, all in one application," says Lawrence Capozzi. "This year Roy advised putting on 800 pounds along the row before planting and side-dressing with another 800 pounds during the growing season. We grew 20 acres and averaged 300 bushels to the acre."

"A ton to the acre was too much to start off the plants. They would have had too much vine."

"We used to over-feed pickles, too," says Frank Capozzi. "As a result, plants were stunted, and what fruit we did get was of poor quality." Following Roy's recommendations, the brothers applied 400 to 500 pounds of 5-10-10 per acre, each time in two applications. They used to apply 1,500 to 2,000 pounds per acre in one application.

"We usually sidedressed, too, with nitrate of soda. This, we found out, was giving us all vine, but little fruit.

The Capozzis figure they saved three to four tons of fertilizer on 15 acres of pickles and one ton of nitrate of soda.

Fruit growers, too, have been taking advantage of this personalized soil testing service. And it saved one peach orchard for Jonathan Sahms, Glassboro farmer.

"Leaves were yellowing and falling off," says Sahms. "We thought the ground had been farmed too much. But we had the soil tested, and found that the pH was too high. Following Roy's advice, we stopped liming

and fertilized heavier and brought that orchard around to where it produced an excellent crop."

They applied extra potash this year at the 87-acre fruit farm in Sewell, owned by Robert Freidrick, Jr. Color and size of the Starking was much improved over past years.

"Our apple crop was more than three times as heavy this year as in 1953, as a result of following the soils service recommendations along with doing a better job of spraying and management. And the trees have much stronger buds for next year's crop."

About 14% of the samples taken in two years by Flannery have come from soils planted to hay, pasture and grain crops. Probably typical of the field crop farmers is dairyman Alvin String, of Harrisonville. Al points out that basically, the value of the service is that it takes the guesswork out of fertilization. "Instead of applying plant food as usual on our pastures and hay crops (bluegrass and alfalfa-brome) we now apply exactly what is needed.

"We had our entire farm soil tested this year,' says String. "One field of alfalfa, we found, had enough phosphorus and potash carryover to enable us to cut our standard half-ton application down to none on two fields." An irrigated field is tested two or three times a season.

The personalized and prompt service, most agreed, is the most important part of the program. As one farmer put it: "It brings research right onto your own farm . . . and in hours, not years."

In the two years the service has been available, 4,181 soil samples have been taken. About 61% of these were from fields in vegetables, 21% in fruits, 14% in hay, pasture and grains, with 4% in other crops.

It would be hard to measure the value of such a program in dollars and cents. But talking with the farmer-cooperators will convince even the skeptic that soil testing pays big dividends . . . dividends in better quality, higher yields, better use of the land, and, most important, higher net income per acre.

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**Space and motion studies in the Salt River Valley** of Arizona show bees can spend too much time going to and from work to do the most efficient job of pollinating cantaloupe blooms. By cutting down the flying distance from hive to bloom, the yield of cantaloupes was increased from an average of 161 crates per acre to 242 crates; an increase of 81 crates. When bees go to and bees go fro, there's no time to spread pollen on the come and go.

# FARMERS NEED TREE LIFE BELTS

**Shelterbelts and windbreaks are money-makers and make for better citizenship. . .**

Condensed from Crops & Soils

*Robert M. Dunford*

IS your farm equipped with a life belt?

We think of a life belt as a life preserver in the form of a buoyant belt. Buoyancy implies such lightness or vivacity of heart or spirits as to give freedom from depression and discouragement. Is there a farmer who does not desire such freedom and security?

Life belts specially designed to give farmers a buoyant feeling of animation and security can be had in the form of shelterbelts and windbreaks.

Windbreaks consist of any planting arrangement of trees that will reduce the effect of damaging winds about farmsteads. Much like windbreaks, but more extensive, are the shelterbelts, a term used to denote comparatively narrow strip plantings — sometimes s i n g l e rows of trees—that are designed to protect fields. These barriers will deflect surface winds and reduce their velocity.

Shelterbelts and windbreaks slow down the speed of wind for a distance of about 20 times their height. A shelterbelt 30 feet high will cut wind speed out to a distance of 600 feet from the shelterbelt.

Grant A. Harris, Utah State Agricultural College Extension Forester, is convinced that windbreaks and shelterbelts really serve their owners. He says that an effective tree wind-stopper may save a farmer up to 25 percent on his winter's fuel bill alone. Savings up to 30 percent have been reported in some areas of the Great Plains. If the protection extends to the livestock feed yard, a similar sized savings may be made in feed required to maintain the animal members of the farm.

Instead of trapping man, the snow is trapped by tree belts. It

Reprinted by permission from Crops & Soils, Madison, Wisconsin, December 1954

is deposited on the agricultural land in designated areas instead of in driveways, dooryards, and other utility lots. This added moisture is one of the reasons why crop yields usually are higher when crops are protected by shelterbelts. What farmer would object to this?

Moisture is also conserved by reduced evaporation—very important in regions of low rainfall. From Scotts Bluff County in Nebraska, it is reported that, in growing alfalfa, an irrigated field protected by shelterbelts required one less irrigation a season than unprotected fields on near-by farms.

The mission of shelterbelts is to save soils and protect crops. By reducing wind speed, soil blowing is reduced or prevented. Damage to crops, such as blowing seeds or seedlings out of the ground, cutting off seedlings, or blowing down mature crops often can be prevented by shelterbelts. In summer the trees furnish shelter to insect-destroying birds.

Most shelterbelts are planted on valuable crop land; a 3-row planting 218 feet long will use 1/10 acre of land; a 5-row planting 97 feet long will use 1/10 acre of land, according to Raymond R. Moore, Extension Forester of Utah. Many farmers say that shelterbelts planted where they are needed pay many times over for the ground they occupy, by increasing yields on the rest of the fields.

In developing a shelterbelt, the present-day tree planter can progress with a great deal of assurance, especially if he will seek the assistance of his local State or Federal forester, State college, county agent, or district conservationist.

There are many details involved in the successful establishment of a windbreak or shelterbelt. Many of these must be worked out to meet local needs. A number of fundamental principles, however, contribute to success.

Careful preparation of the site, good planting with hardy stock, and thorough cultivation are three factors that go hand in hand. When all three are well done, the results are sometimes spectacular. You cannot slight one of them, however, and hope to make up for it by intensive application of others.

Good preparation of site means thorough tillage and, if the soil is weedy or dry, summer fallowing for a season. Better growth and survival are obtained. A planting made on fallowed land usually grows enough faster to more than make up for the 1-year delay in planting. Some sites call for subsoiling, others terracing, contour planting, or, in the drier regions diking and building of water-diversion structures.

It is extremely important that the planting stock be grown from seed produced in the general locality in which the trees are to be planted. A good guide, though not always a sure one, in choosing sturdy stock is the observed behavior or different species in localities.

Thorough cultivation is necessary during the first 3 to 5 years of the shelterbelt. Weeds and trees cannot survive together. It is one or the other. As soon as the crowns of the trees come together enough to shade out grass and weeds, cultivation can be discontinued, except in dry areas where rainfall is so scant that continued cultivation is necessary.

Two great enemies of trees are fire and livestock. Fire destruction is usually sudden and complete. The damage caused by livestock is as sure as fire in eventually destroying the windbreak or shelterbelt. Livestock of all types must be kept out of the trees. Fences should be built around the planting, leaving not less than 10 feet between the outside rows and the fence to allow for cultivation.

The aesthetic value of the long belts of trees in a once treeless area is immeasurable. Their presence instills a sense of comfort and stability. It is a natural instinct for people to want to be where trees are and if there are none, people either plant trees or leave the area.

One old prairie farmer said, "Trees can change a farm from just a place to live into a home."

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Federal funds for agricultural research this year have been increased about 10 million dollars over last year's funds. Of this, 5.7 million was added to Federal-grant funds to states and territories.

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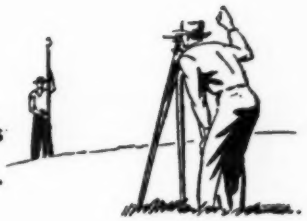
## Watch Beef Prices

Corn-fed beef cattle price trend is down but has been obscured by long-fed fancy show "throw-out" cattle not good enough for competition. More cattle are still on feed than usual. We should remember that the annual high for choice fed cattle usually comes around Mid-September with a drop of around $1.50 per cwt. by Mid-February; a further loss of 50c more by Mid-May; followed by a gradual recovery of $2.00 by Mid-September. Wars, supply and demand cause unusual deviations sometimes quite pronounced. Economic trends, fluctuation in price levels, including recurring eras of prosperity and depression, keep throwing things out of joint. That is what makes the future interesting.

*Do-Well Agricultural Letter*

# Leadership at Work

**Community spirit binds rural people together. . .**



Condensed from Extension Service Review

*Rosslyn Wilson,* Assistant Extension Editor, Tennessee

WHEN 400 FARM men and women, representing 2,100 families, accept responsibility for improving their pattern of farming and rural life, leadership is at work.

Such growth was evidenced at Muscle Shoals, Ala., recently at a meeting of test-demonstration families from 97 Tennessee watershed counties of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee and Virginia. These families, representing 20 years of pioneering in the whole-farm-and-family approach to resource development, organized a valley-wide association to further advance the agricultural revolution under way in this region.

Test-demonstration farm families are key people in service to the Nation's agriculture. Using the Tennessee Valley Authority's experimental fertilizer plant, these familes are teamed up with research and extension know-how. The 400 or so who attended the Alabama meeting represented some 2,100 families in the valley who use TVA fertilizers in planned farming systems. Their work is guided by extension agents, who provide research information on farming and homemaking and help the family fit it into the best possible pattern for them. These farms serve as on-the-spot proving grounds and demonstration of adjustments which make the most of soil, climate, and market resources, all different in each family situation.

Their successful experience has laid much of the groundwork for expanded extension work on the unit approach to farm and home development.

The meeting at Muscle Shoals climaxed a growing desire by test demonstrators to exchange experiences and ideas among

Reprinted from Extension Service Review, Chicago, Illinois, December 1954

the different valley peoples. County associations of test-demonstration families, organization families, organizations which plan and guide the work locally, financed the trip for most of the delegates.

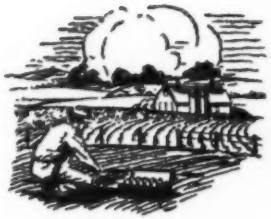
Outstanding speakers were test demonstrators from different States. Their stories of success in improving soils and translating them into better crops, livestock, buildngs, machinery, and family living were impressive. Facts and figures were joined in summations of family achievement and influence of the work on community and county.

B. B. Jessie, Russel County, Va., quoted figures showing that his cash returns from his livestock enterprise have multiplied 10 times since 1934. In this same period his cash returns from crops increased 6 times. Mrs. J. B. Baker, Mississippi homemaker, described how whole-farm-and-family development enabled her family to rise from tenancy to farm ownership as it achieved better living. Mrs. Charles Barnard, homemaker from Caly County N. C., entranced the audience with her description of the test-demonstration role in helping a "poor little mountainous county," pushed still farther up the hills by impounded waters, lift itself by the bootstraps of organized community effort to spread the pattern of enrichment pioneered by these families.

"We didn't realize that our work was part of such a big program," said one delegate to the meeting. "It has been eye-opening to see that we are tied into a project of national scope, and that the work of each family contributes to the growing store of information which is having its effect on the entire region." With this feeling, the delegates voted to knit together into a valley-wide organization the efforts and leadership of those who serve and have served their communities as test demonstrators. Purely educational in its functions, the association will "provide a medium of exchange between farm people, landgrant colleges, and TVA," and "provide a vehicle whereby the people of the valley can act together on matters of mutual interest."

## Don't Scrimp on Bossy

Don't scrimp "bossy" on her drinking water or you'll lose some of the value of that expensive feed you've been giving her. Tests have shown that providing water so that animals have free access to it increases the milk yield of high producing cows about four per cent over watering twice daily and six to 11 per cent over watering only once daily.



# Fixed Nitrogen

**How research has benefited the farmer. . .**

Condensed from Chemurgic Digest

*E. W. Sargent*

NITROGEN is an odorless, colorless gas which is a key element in all plant and animal proteins. Without it, every human being, every animal, and every plant on earth would perish.

It makes up about 80 per cent of the air we breathe. Some 70,000,000 pounds of nitrogen are in the column of air above each acre of land. Despite this, no human being or animal can use any of it, and only very few plants can benefit. To be useful, nitrogen must be "fixed," or combined with another element. And nature sets rigid rules for this.

Natural fixation of nitrogen takes place in the sky and in the ground. Each time lightning crashes, it fixes atmospheric nitrogen which is then carried to the ground, as nitric and nitrous acids, with the next rain. Soil-fixed nitrogen is made available by the action of soil bacteria which work it over until it is ready for its next job—absorption by the plants. Man and animal then get nitrogen simply by eating the plant. Man has another source of nitrogen: he also eats the animals which eat the crops.

For centuries man has known that intensive cultivation impoverishes the soil. This he could see after each succeeding harvest when his soil would yield less and less abundant crops. Desperate, farmers turned to anything—until they discovered the compost heap, a super storehouse of fixed nitrogen. Why it worked, the farmer never knew. But it enriched his soil and produced better crops, and wisely, he treasured it.

But it was only at the end of the 18th century that the French

Reprinted by permission from Chemurgic Digest, New York City, October 1954

chemist, Lavoisier, and others showed that air was a mixture consisting of oxygen and nitrogen. From this stemmed investigations which showed nitrogen was basic to healthy soil and healthy plants. But it was being taken out of the soil much faster than it was being replaced. And natural deposits were, at best, a pitiful buffer. Nitrogen starvation of the soil became so severe that as late as 1898, Sir William Crookes, a leading British scientist, stated flatly that unless some way was devised to get nitrogen out of the air and into the plants, those races which depend on wheat for bread would "be squeezed out of existence . . ."

What was needed was an abundant, inexpensive source of nitrogen, independent of price fluctuations, degrees of quality. All this has been the signal contribution of the infant chemistry industry which utilized the brilliant groundwork laid by the German scientist, Haber, who found that in the presence of a suitable catalyst, nitrogen and hydrogen could be united to form ammonia. The industry separated nitrogen from air and hydrogen from water and catalytically combined them under high temperatures and pressures. This advent of commercial production of fixed nitrogen was called a ". . . basic achievement upon which rested the advance of modern civilization." The introduction of fixed nitrogen effected a new bond between industry and agriculture which has resulted in an increasing use of chemical fertilizer (a 300 per cent rise from 1940 to 1950) and a welcome increase in soil productivity.

Overnight the U. S. fertilizer industry was revolutionized. Ground fish heads and animal intestines were supplemented with tons of scientifically prepared chemical fertilizers. And, behind each ton of nitrogen capacity, stands an industry investment of $250. In 1951, American industry was fixing 1,650,000 tons, and expanding rapidly.

Du Pont was one of the earliest U. S. manufacturers of fixed nitrogen, having acquired processes from the French and Italians in the early 1920's. By 1931, du Pont, as a pioneer in nitrogen research was producing synthetic urea, a newer form of fixed nitrogen which was more efficient and convenient. Even more important, urea opened up such promising new fields for agriculture that intense research was immediately started by colleges, experiment stations and du Pont.

Among many important results of this research, two major ones stand out. One was the discovery that nitrogen in the form of urea can be applied directly

to the leaves of growing plants. This allows the farmer to practice precision nitrogen feeding —pinpointing applications at times of greatest need by the crops. With this development, du Pont introduced "NuGreen" fertilizer compound, containing 45% nitrogen in the form of urea. "NuGreen is specially formulated for use in foliage feeding, as well as the more conventional methods of fertilizer application.

Another result of research was the development of the discovery that urea as a food ingredient can be of enormous benefit to cattle and other ruminant animals such as sheep and goats. In fact, nitrogen, in the form of urea, can be used to supply up to one-third of the cow's protein needs. Already du Pont alone has supplied enough of its "Two-Sixty-Two" feed compound to increase the nation's protein yield by 600,000,000 pounds, or the equivalent of all the meat protein consumed by the entire population of the United States in two months.

Another advantage is that roughages, such as corn cobs, which were once thrown away, can be used efficiently by ruminants which are fed urea. Thus, more cropland—once used to raise feed for cattle—is now available to raise food for man.

## Don't Gamble with Human Brucellosis

There are more cases of human brucellosis in rural areas because there is more opportunity for exposure. Sometimes it has been known as Malta fever or Undulant fever, and it is possible that there are more cases than are reported.

People rarely, if ever, get brucellosis from other people. They get it from animals, says Dr. F. A. Hall, Purdue University. Exposure to the brucellosis germ may result from drinking unpasteurized milk from infested cattle, by handling infested animals and their discharges, or by aiding carrier females that are giving birth to young.

It should be emphasized that proper pasteurization makes milk safe as far as the threat of brucellosis is concerned. Drinking raw milk produced by cows with uncertain health history is a dangerous practice.

Most cases of brucellosis in people develop from direct contact with infested animals. In addition to handling infested cows at freshening time, swine growers may be exposed when castrating infested male pigs, by assisting sows at farrowing time, and by home butchering of diseased swine.

*Purdue Extension Service*

# Operation Screwworm

**USDA Entomologists experiment with atomic energy in an effort to eradicate this pest . . .**

Condensed from Agricultural Research

ON THE Caribbean island of Curacao, USDA entomologists hope to prove that the vicious screwworm can be vanquished from an area.

Using one of their most modern weapons—atomic energy—scientists are working with island authorities in an attempt to eradicate this pest from the small Dutch possession. The pilot research may break the way for the much bigger job of driving the screwworm out of the southeastern United States.

Underlying this promising experiment is one basic fact: female screwworm flies mate only once. Entomologists are exploiting this habit by saturating the wild population with thousands of laboratory-reared male flies—normal appearing but made sexually *sterile* by exposure to gamma rays from radioactive cobalt supplied by the Oak Ridge National Laboratory in Tennessee.

Infiltrating sterile males will theoretically reduce the next screwworm generation by the same degree that they outnumber normal males. For example, turning loose five sterile males for every normal male fly should cut the potential population by about 80 per cent.

Our entomologists got good results when they first field-tested this idea on Sanibel, a small island off the cost of Florida. But flies from the mainland moved in later to replenish the screwworm population.

On Curacao, 50 miles from the nearest land, there's no chance of natural infiltration.

Here, the new Operation Screwworm began last spring. Among the first jobs was measuring the strength of the enemy. Then the entomologists released the first consignment of 52,000 sterile screwworm males on March 26 and followed up with 100 flies a week for each of Curacao's 170 square miles of

Reprinted from Agricultural Research, U. S. Dept. of Agriculture

area.

Beginning August 1, the researchers stepped up the attack, doubling the weekly infiltration rate of sterile males. On September 1, the release rate was again doubled. This should finish the job.

Eradication of the screwworm from Curacao will furnish entomologists with the knowledge and encouragement for a possible campaign against this pest in Florida.

Each spring and summer in the United States, screwworms migrate north from Florida and Texas to infect the wounds of midwestern and southern livestock. The eggs that screwworm flies lay in the wounds hatch into scores of maggots. Feeding on meat and blood, they can sap the strength of an animal—or even kill it. Although USDA scientists have developed a wound smear that destroys the maggots and egg-laying adults, screwworms still cost livestock producers millions of dollars a year.

Each winter their advance line falls back into southern Florida and Texas, where the temperatures are warm enough for them to survive. The entomologists believe they can likely eliminate the pest from the Southeast by attacking the Florida infestation during the winter.

The Texas source of infestation presents an almost impossible eradication problem, since screwworm flies can move in easily across the Mexican border.

But the entomologists believe Texas screwworms could be kept from moving back into a screwworm-free Southeast. The Gulf Coast climate and marshlands apparently form a natural barrier, because there weren't any screwworms east of the Mississippi till infested cattle were shipped to Georgia and Florida about 1934.

The primary screwworm fly is bluish green in color and has three dark stripes on its back. The space between and below the eyes is a reddish or orange color. It is often mistaken for one of the two common carcass-breeding species of blowflies which have almost identical color markings, although as seen in nature it is more robust and has a darker color. Only rarely is it observed on dead animals, but it is frequently seen feeding and laying eggs in the wounds of live animals.

The fly generally seeks the edges or a dry portion of the wound on which to deposit its eggs. From 50 to 300 eggs are laid at one time, fastened tightly to the tissue surface in compact shinglelike masses. A single female is capable of laying 3,000 eggs, which are deposited in masses of about 300 at 4-day intervals.

Hatching of the eggs occurs in

11 hours, and the young whitish worms immediately burrow into the flesh, where they feed and grow for a period of 4 to 7 days.

During the larval, or maggot stage the worms shed their skins twice. When the worms have reached their full growth they assume a pinkish color, leave the wound, and drop to the ground, where they dig beneath the surface and undergo a change to the hard-skinned, dark-brown, motionless pupa. It is during the pupal stage that the transformation from the maggot to the adult fly stage takes place.

After the pupa has been in the soil from 7 to 60 days the fly emerges from it, works its way to the surface. and crawls up on some nearby bush, weed, or other object to allow its wings to unfold and its outer body coverings to harden. When it first comes from the pupa, the fly is a grayish color without distinct markings, but as its body hardens it assumes its characteristic coloration. Under favorable conditions about 5 days are required before the newly emerged female fly becomes sexually mature and ready to lay eggs. During warm weather the life cycle is usually completed in 21 days, but under cold, unfavorable conditions the cycle takes as many as 80 days.

The injury this parasite does to animals is inflicted by the worms or maggots. The debilitating effect and the destruction of tissue kill the infected animal in a few days. The screwworm destroys untold numbers of domestic and wild animals from South Carolina to California, and this loss, together with the amount of labor required to prevent and treat infestations, costs North American livestock owners many millions of dollars annually.

## Blower System Cuts Feed Work

Here's a way to save most of your labor in livestock feeding.

Robert W. Kleis, a University of Illinois engineer, says it's practical to blow grain and ground feed 50 to 300 feet through sheet steel pipe. The pipe, he said, can be four, five or six inches in diameter.

Power needed can be figured like this: One horsepower for each 100 feet of pipe plus one-third horsepower for each 1,000 pounds of grain moved per hour. He pointed out that the system is simple and the weather-proof pipe can be suspended in the air. He said the blower system is not as efficient as the mechanical conveyor, however.

# Pleasure Horses Are Fun If You Can Afford Them

## A noted horse authority gives some sound advice . . .

Condensed from The Cattleman

*Wayne Dinsmore*

ARABS, Thoroughbreds, Standardbreds, Quarter Horses, Morgans, Hackneys, American Saddle Horses, Walking Horses, Palominos, and the pony breeds—Welsh and Shetland—all have some utility value, but most of them are used principally for pleasure. Making money out of their breeding, rearing and training is a 1,000 to 1 shot, but persons who can afford the risk derive much fun from their production and use.

Raising pleasure horses does not pay in cash returns. It does pay in friendships made with fine people, in wholesome recreation, in forward looking thoughts, in health building benefits to parents and children who ride, and sometimes—when one is fortunate enough to produce a winner—in prestige and a measure of fame.

Assuming that a person or family has some money to spare for recreation, a liking for horses and a disposition to invest some funds in equines for fun, without expecting a cash return, the first question is—"what pleasure breed should we select?"

Some knowledge of all the light breeds, their origin, history, development and present day characteristics should be acquired before a decision is made. Complete information is to be found in a little book "Our Equine Friends" published by the Horse Association of America, and still obtainable by sending 25 cents in silver or stamps to them at 407 So. Dearborn St., Chicago 5, Ill.

Study of this little book will give any one a clear idea of all the light breds, their interlocking relationships, their characteristics and what to look for in excellent animals. It gives also the name and address of the registry association for each breed, where the rules of registry and transfer can be secured, and also

Reprinted by permission from The Cattleman, Fort Worth 2, Texas

the names and addresses of magazines promoting each breed. From such magazines it is easy to ascertain where most animals of a particular breed are being raised, the names and addresses of leading breeders and some idea of prices being paid for good animals.

These things will help a prospective purchaser of horses "for fun—with a long chance at a profit"—to decide what breed of light horses should be looked into.

Obviously, it is futile for a prospect who can spare only a few hundred dollars per annum, to consider a breed where the expenses would run into many thousands. This limits choice of breed.

Having decided what breed the prospect can afford to play with, it is wise to take a motor trip to see some of the breeding establishments that have produced some of the best animals of the breed that is being considered. Such a trip, to four or five of the best studs of the breed favored, is a sound expenditure of money; for when one has seen some of the best animals of a breed, a better evaluation of those later considered for purchase can be made.

It is well to take time—to spend at least a year learning about these things, and looking at excellent animals—before considering actual purchases. Time and again I have seen people who purchased in haste, repent at serious loss. It is easy to buy but hard to sell a lemon, whether it be in a breed or an individual.

Visiting leading shows where animals of the breed favored are shown, is another desirable move. If one's taste and pocketbook is toward race horses, some time should be spent at the races. Here it will soon be observed that excellent conformation and soundness are often found in horses that lose races, as well as in winners; and study will reveal that the breeding of winners and losers is often so similar that it is difficult for qualified men of long experience to explain why some win and the others lose, even when they are in the same stable, under control of the same trainer.

Also, it will be learned that it will cost at least $5,000 a year to train and campaign a Thoroughbred or Standardbred, and probably $3,000 for a Quarter Horse. This is in addition to the purchase price paid at the outset, which will be apt to range all the way from $1,000 to $20,000. Playing with race horses is therefore expensive and requires plenty of money and a willingness to lose it for fun; for race winnings rarely equal expenses.

The other light breeds are exhibited in show rings, at halter or in performance classes. The prize money won, even by the best stables, rarely begins to offset the expense of fitting and showing, for it will cost at least $6,000 a year to train, fit and show five horses and the money won is trifling, as horse show earnings are so slight from admissions and seat charges, that shows have scant funds with which to pay prizes. The glory of winning is supposed to be enough to bring out a good field of competitors, but it does not pay feed bills, hired help and transportation expense. Those who exhibit at several shows, do so at a heavy loss and must consider whether they can afford such outlay for what fun they get out of it. Too often beginners incur losses they cannot afford, because they did not know how deep they would get when they started.

### The Brighter Side

There is a brighter side to horses for fun, especially if you live on farm, plantation or ranch. Here some horses are kept for work with stock, which services counterbalance cost of keep. Initial purchase cost need not be high, for if races and shows are to be ignored, animals that will not win races or rate in the ribbons at a show may nevertheless be almost as and every bit as good in their manner of walking, trotting and cantering, and for pleasure riding are quite as good as others costing many times as much; for such animals can be bought for far less than winners or near winners and are fully as serviceable.

The cost of maintenance also is much less, for even if it is not charged off against work done after livestock or surveying crops, it will be slight; for the mounts can run out on pasture when not in use, and $5.00 a month is considered plenty when a charge must be set up against the pleasure horses used by the family. In non-pasture months they can be carried on good hay and long forage at about the same cost for they are not getting much use at such times.

In the city a horse being ridden four or five times a week from six to eight miles a day will keep in good condition for a year, on three tons of choice hay, half of it alfalfa, balance any good green, leafy hay and and about 80 bushels of oats; also about two tons of straw for bedding. I know this is ample for I have kept riding horses in a residential district in Chicago from 1922 to the present. Horses out on pasture and ridden over farms and ranches

purely for pleasure need not be shod unless the ground is very stony. It is sufficient to keep their feet trimmed level with a rasp, which can readily be done by the father or one of the teen age boys.

Every family should have two mounts if they are really interested in "horses for fun." This will permit the father to take the children riding, to train them, unobtrusively, to ride easily and naturally and to see the wonders of the outdoors so well seen from the saddle. The older children, when qualified as good riders, can take the younger ones out and also will be much sought after by their schoolmates who are not fortunate enough to have horses. Your children who ride well will be extremely popular.

At least one of the animals purchased should be a mare in foal to a good stallion of her breed. The arrival of the foal, its early efforts to nurse, walk, run and play, are of fascinating interest to young children and they will learn much as they observe how the foal is taught to lead, stand tied, have its feet picked up and handled and kept level while it is growing.

Parents likewise profit, for they are looking forward with interest to see what the foal will develop into—perhaps into a prospect so good some one will buy it at a good price.

A man of great wisdom said long ago: "No man with a good yearling ever becomes seriously depressed." Looking ahead, with children, to the development of a good foal, is fun and keeps all who are concerned interested in the mysteries of life as revealed in birth, growth, response to training at home and the foal's subsequent achievement in the equine world.

## More Molasses

According to the U. S. Department of Agriculture, livestock ate more molasses in 1954 than ever before. About 391 million gallons were fed to livestock last year compared with 354 million in 1953 and an average of 208 million gallons from 1947 to 1951. No doubt one of the reasons for this increase is the prevailing low price for molasses compared to corn. Molasses can be had for around 1¾c per pound and slightly higher. However, another reason may be the growing popularity of at least a small amount of molasses in the ration. Cattle and lambs both finish a little better on molasses, feeders will tell you, and also cattle will stay on full feed just a little better if they receive some molasses daily.

*Nebraska Livestock Feeder*

# Indian Boys and Girls are Winners in 4-H Clubs

**4-H clubs are developing Indian boys and girls into farm leaders. . .**

Condensed from New Mexico Extension News

CARL Martin is a 14-year-old American boy, living with his family on a small ranch near Crownpoint, New Mexico. Like other rural boys and girls in the United States, he rides the bus to and from school and regularly attends the meetings of his 4-H club. He learns about better ways of farming and living and carries the message home to his parents and neighbors. He learns what it is to be a good citizen, too.

Carl is a Navajo Indian, living on the reservation in northwestern New Mexico. He's one of 850 Indian boys and girls who are members of 4-H clubs in the Sunshine State.

New Mexico, third largest state in Indian population, had more than 34,000 Indians registered in the 1950 census. The Indian 4-H club enrollment in the state in 1954 was the largest in the nation. And the steadily increasing interest of Indian boys and girls in club work is evidence of the effectiveness of the program.

The 43 Indian 4-H clubs in New Mexico are conducted like 4-H clubs anywhere. The members carry the usual projects (with certain specialties) under the supervision of local Indian leaders, elect their officers, present demonstrations, and participate in achievement days and county and state fairs. County winners compete at the state encampment at New Mexico A&M College. Their leaders attend the annual New Mexico club leaders' short course. Some members go on to college to specialize in agriculture and home economics.

Club work is very practical for Indian 4-H'ers. What they have learned about livestock improvement, especially in sheep and wool, has done much to improve the livelihood of their families. They excel in gardening project work. They take easily to embroidery, and other

Reprinted from New Mexico Extension News

handicrafts, especially weaving. At county and state club camps, they astound their fellow campers by their knowledge of native plants and wildlife.

Indian 4-H club boys and girls in New Mexico have established records that compare favorably with their "pale-face" fellow club members everywhere. Their percentage of project completions is almost 90 per cent. They win their share of ribbons at state and county fairs. Estimated value of Indian 4-H club projects in New Mexico last year was more than $15,000.

There are outstanding Indian 4-H club members in New Mexico, of course. Virginia Arquero, for five years a club member and now a junior leader of the Cochita 4-H Club, placed third in the Make-it-Yourself-with-Wool contest at the state fair last year. Lawrence Saracino, a 28-year-old Laguna Indian, was one of New Mexico's IFYE delegates in 1952. Since his return to this country, he has made 66 public-speaking appearances before 4-H clubs and councils, parent-teacher association meetings, civic groups, and school assemblies. More than 3000 people have heard him tell about his experiences in India.

As Lin B. Maxwell, extension officers for the United Pueblos agency, with headquarters in Albuquerque, says, "The success of Indian 4-H club work in New Mexico is due to the excellent cooperation and coordination between the Bureau extension personnel and the state and county extension workers. Our Indian boys and girls and their leaders know that they have a real part in the 4-H club program."

So, 4-H club work is playing an important part in the "emancipation" of the American Indian.

## Feeding Hormones To Cattle

Higher rates of gain and greater feed efficiency in fattening cattle have been reported by Purdue University agricultural research men following tests with the oral feeding of hormones. However, recognizable pelvic and mammary changes were induced by oral feeding of hormones to steers. Hormone feeding does not increase fat deposition or improve carcass grade.

Three hormones—stilbestrol, dienestrol and hexestrol—when fed orally to a group of fattening cattle resulted in gains of 50, 39 and 52 pounds respectively, above gains of steers fed a normal ration.

In the Purdue experiments, a group of 40 two-year-old Hereford steers averaging 870 pounds liveweight were selected for the

123-day feeding trial. They were divided into groups of ten; three of the groups were fed the hormones and the remaining were fed a normal ration.

At the end of the test period, steers fed the normal ration had gained, on the average 274 pounds, whereas those fed stilbestrol and hexestrol had gained 324 and 326 respectively. Dienestrol fed steers, gaining slightly less rapidly than either of the other hormone fed groups, gained 313 pounds.

Rate of gain of the hormone fed cattle varied markedly during the experimental period. Most of the increased gain attributed to the hormones occurred during the first 28 days of the tests. The research men state that this early difference cannot be accounted for by the feed intake, as the hormone fed animals consumed the same amount of feed per day as the group fed the normal ration during the period involved.

Intake of corn for the entire period, however, was about one pound per day per steer greater in each of the hormone fed groups than in the normally fed groups. There were no differences in roughage or mineral intake, although both were available to the cattle at all times. Averaging out the feed consumed and the amount of gain, hormone-fed animals required from nine to twelve per cent less feed per unit of gain than the steers fed the normal ration.

Some recognizable pelvic and mammary changes were accompanied by the oral feeding of all three of the hormones at the rate of ten milligrams daily. These effects were less pronounced in the dienestrol-fed steers than in the other two groups.

Official carcass grades indicated that the stilbestrol-fed steers produced carcasses slightly inferior to either of the other hormone-fed groups and considerably below the normally fed animals.

In studying the carcasses of the steers fed hormones, no residual hormones were found in the meat. This was true whether the feeding of the hormones was discontinued the day prior to slaughter,, or whether it was discontinued seven days prior to slaughter.

Knowledge on hormone feeding is still in the formative stage. Care must be exercised that hormone-supplemented rations are not fed to breeding and lactating stock. Under certain conditions pasture and harvested forage may contain female-like sex hormones. It is possible that noticeable mammary development and even lactation may be produced by excessive hormone consumption.

*Purdue University*

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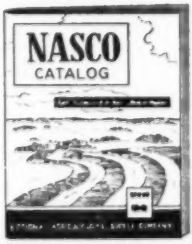


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# You Can Store It In A Bunker Silo

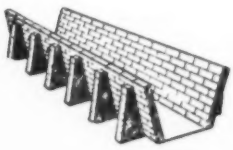
In Canada, the self-feeding, bunker silo is given a great deal of credit for the increasing popularity of grassland farming. In England also, bunker silos are popular. In this country, they seem to be "catching on."

What is a bunker silo? The Canadian version consists simply of two walls not less than 22 feet apart, six to eight feet high, made of tight planking and slightly sloped on the inner side. This planking is nailed to posts set four feet in the ground and at four foot centers. Every second side post may be eighteen feet high to support a permanent roof, if desired. Bottom should be about 12 inches above grade and sloped to the open end. In simple terms, a bunker silo is a trench silo above ground.

The bunker is filled by driving through the silo and either dumping the grass or distributing it with a power box unloader. Silage is compacted with a tractor during filling and each day for eight days thereafter. A covering of sawdust or other material guards against spoilage.

Advantages claimed for the bunker include, (1) Makes good grass silage, (2) Works better for self-feeding because the silo is above ground, well-drained and open at both ends, (3) Makes possible complete mechanization and speeds up harvesting, (4) Permits controlled compaction and makes it possible to ensile some crops without wilting, (5) Costs of a bunker, ton for ton capacity, is only a fraction of a tower silo and may be no more than a well-built trench silo.

Bunker, self-feeding silos have received relatively less attention in the U.S. than in Canada, but you will be hearing more about them. For many farmers, they appear to be a happy medium between the tower and trench.



Left: A bunker silo to be constructed of concrete blocks is offered by Nebraska Crib & Silo Co., Fremont, Nebraska. Other "bunkers" are being built of precast concrete slabs. Still others constructed of wood are a part of new self-feeding barns.